

Public Information Materials

1/30/02

Restoration Advisory Board Meeting Held at Irvine City Hall Irvine, CA

Materials/Handouts Include:

- RAB Meeting Agenda/Public Notice – 1/30/02 RAB meeting.
- Meeting Minutes from the November 28, 2001 RAB Meeting – 53rd RAB.
- MCAS El Toro RAB Meeting Schedule, Full RAB and RAB Subcommittee (Sept. 2001 – July 2002).
- MCAS El Toro RAB Mission Statement and Operating Procedures.
- RAB Membership Application – MCAS El Toro RAB.
- MCAS El Toro Installation Restoration Program – Mailing List Coupon.
- MCAS El Toro Administrative Record File - Information Sheet (for on-Station access).
- MCAS El Toro Information Repository - Information Sheet.
- MCAS El Toro Where To Get More Information Sheet.
- Internet Access – Environmental Web Sites.
- MCAS El Toro Marine Corps/Navy RAB Co-Chair (address, telephone, fax, e-mail).
- MCAS El Toro - For More Information on Redevelopment.
- Contact information for Steven Sharp, RAB member representing Orange County Health Care Agency.
- MCAS El Toro RAB Acronyms and Glossary of Technical Terms.
- MCAS El Toro Base Realignment and Closure Business Plan, Introduction Section, March 2001.
- MCAS El Toro Environmental Compliance Program Location of Concern (LOC) Status Table (January 24, 2002).
- Department of Navy – Policy for Conducting Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Statutory Five-Year Reviews, November 2001.
- Department of Navy – Land-Use Controls at Marine Corps Air Station (MCAS) El Toro.
- Department of Defense – Institutional Controls, Spring 1997.
- Department of Defense – A Guide to Establishing Institutional Controls at Closing Military Installations, February 1998.
- Department of Defense – Responsibility for Additional Environmental Cleanup after Transfer of Real Property.
- *Presentation* – IRP Site 1 Remedial Investigation Ordnance/Explosives Range Evaluation Fieldwork Update, MCAS El Toro, January 30, 2002, Presented by Eli Vedagiri, Earth Tech, Inc.
- *Presentation* – MCAS El Toro Pre-Design Investigation IRP Sites 3 and 5 and Removal Site Evaluation on Anomaly Area 3, January 30 2002, Presented by Crispin Wanyoike, Earth Tech Inc.
- *Presentation* – MCAS El Toro Funding, Restoration Advisory Board Meeting, January 30, 2001, Presented by James R. Sheetz, P.E., Business Line Team Leader, SWDIV.

Agency Comments and Letters - U.S. Environmental Protection Agency (U.S. EPA)

- U.S. EPA Handout – Background Perchlorate Information for Arizona, California and Nevada, Provided by: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA.
- Handout – California Department of Health Sciences, Perchlorate's Drinking Water Action Level and Regulations, Last Update: January 18, 2002
(From: www.dhs.ca.gov/ps/ddnem/chemicals/perchl/actionlevel.html),
Provided by Nicole G. Moutoux, Remedial Project Manager, U.S. EPA.

Agency Comments and Letters – California Environmental Protection Agency (Cal-EPA)

- Cal-EPA, Department of Toxic Substances Control (DTSC) – Comments on Remedial Design (60% Submittal), Installation Restoration Program Sites 2 and 17, MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Triss M. Chesney, Remedial Project Manager, DTSC (letter dated January 14, 2002).

California Regional Water Quality Control Board (RWQCB), Santa Ana Region

- No Items Submitted

RAB Subcommittee Handouts and Letters *(provided by Marcia Rudolph, MCAS El Toro RAB Subcommittee Chair)*

- MCAS El Toro RAB Subcommittee Meeting Minutes, September 19, 2001 meeting.
- MCAS El Toro RAB Subcommittee Meeting Minutes, November 29, 2001 meeting.

**MCAS El Toro
Restoration Advisory Board**

*Irvine City Hall
Conference and Training Center
One Civic Center Plaza, Irvine*

**January 30, 2002
6:30-9:00 p.m.
55th Meeting**

**RAB Subcommittee Meeting
5:00-6:00 p.m., Room L-104**

AGENDA

RAB members that are unable to attend please call either Dean Gould, Marine Corps/Navy RAB Co-Chair at (949) 726-5398 or (619) 532-0765 -or- Greg Hurley, RAB Community Co-Chair at (949) 719-2289.

Question and Answer (Q&A) Ground Rules

- **Q&A follows individual presentations; time designated for presentations includes Q&A time.**
- **"Open Q&A" session (environmental topics) is at the end of the New Business segment.**
- **After adjournment, Marine Corps/Navy representatives are available to answer more questions.**

Welcome/Introductions/Agenda Review (6:30-6:40)

Dean Gould
Marine Corps/Navy RAB Co-Chair

Old Business (6:40-7:05)

Approval of 11/28/01 Minutes (6:40-6:45)

Greg Hurley
RAB Community Co-Chair

Announcements/Review of Action Items (6:45-6:55)

Dean Gould & Greg Hurley

Subcommittee Meeting Report (6:55-7:05)

Marcia Rudolph
RAB Subcommittee Chair

New Business (7:05-8:55)

- Community Co-Chair Discussion (7:05-7:30)

Dean Gould	Greg Hurley	Marcia Rudolph
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- Regulatory Agency Comment Update (7:30-7:45)

Nicole Moutoux U.S. EPA	Triss Chesney Cal-EPA DTSC	Patricia Hannon RWQCB
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- Site 1 Remedial Investigation Field Work Update
(7:45-8:00)

Eli Vedagiri
Earth Tech, Inc.

- Environmental Funding for MCAS El Toro (8:00-8:15)

Dean Gould

- Sites 3 and 5 Landfills (8:15-8:45)

Crispin Wanyoike
Earth Tech, Inc.

- Pre-Design Investigation
- Anomaly Area 3 Removal Site Evaluation

- Open Q&A (Environmental Topics) (8:45-8:55)

Dean Gould

Meeting Summary & Closing (8:55-9:00)

Greg Hurley & Dean Gould

Meeting Evaluation & Topic Suggestions for Future Meetings

P U B L I C N O T I C E

MARINE CORPS AIR STATION EL TORO
Restoration Advisory Board Meeting



55th Meeting
Wednesday, January 30, 2002
6:30 - 9:00 p.m.

Irvine City Hall
Conference and Training Center
One Civic Center Plaza, Irvine

The Restoration Advisory Board (RAB) is composed of concerned citizens and government representatives involved in the environmental cleanup program at MCAS El Toro since 1994. Community participation and input is important and appreciated. This meeting will feature the following activities and presentations specific to MCAS El Toro:

- Update on Site 1, Explosives Ordnance Range, Remedial Investigation Field Work
- Environmental Funding for MCAS El Toro
- Sites 3 and 5 Landfills:
 - Pre-Design Investigation
 - Anomaly Area 3 Removal Site Investigation



For more information about this meeting and the Installation Restoration Program at MCAS El Toro, please contact:

Base Realignment and Closure
Mr. Dean Gould
BRAC Environmental Coordinator
P.O. Box 51718, Irvine, CA 92619-1718
(949) 726-5398 or (619) 532-0784

MARINE CORPS AIR STATION EL TORO
RESTORATION ADVISORY BOARD MEETING

November 28, 2001 – 54th Meeting

MEETING MINUTES

The 54th Restoration Advisory Board (RAB) meeting for Marine Corps Air Station (MCAS) El Toro was held Wednesday, November 28, 2001 at the Irvine City Hall. The meeting began at 6:36 p.m. These minutes summarize the discussions and presentations from the RAB meeting.

WELCOME, INTRODUCTIONS, AGENDA REVIEW

Mr. Dean Gould, BRAC Environmental Coordinator (BEC) for MCAS El Toro and Marine Corps RAB Co-Chair, called the 54th RAB meeting to order. He asked all those in attendance to introduce themselves and self-introductions were made. Mr. Gould presented an overview of the agenda.

OLD BUSINESS

Review and Approval of the September 19, 2001 Meeting Minutes

Mr. Greg Hurley, RAB Community Co-Chair, asked for approval of the September 19, 2001 RAB meeting minutes. The minutes were approved by the RAB without amendment.

Announcements

- Mr. Gould confirmed that the next RAB meeting (6:30 – 9:00 p.m.) and RAB Subcommittee meeting (5:00 – 6:00 p.m.) would be held on Wednesday, January 30, 2002, here at the City of Irvine.
- Mr. Gould thanked all RAB members for attending this evening. He then challenged the RAB to be strong ambassadors of RAB meeting participation and the Navy's environmental cleanup program. He asked everyone to get the word out to encourage more community members to attend the meetings in the coming new year and to bring a friend to the next RAB meeting. He emphasized that RAB meetings are the key public participation component of the Navy's Installation Restoration Program and that the Navy relies upon these meetings as a focal point for communication.
- Mr. Gould announced that there are two new Remedial Project Managers (RPMs) on the Navy's MCAS El Toro-Tustin team. The first is Ms. Kyle Olewnik, who previously worked for the Regional Water Quality Control Board. She will be focusing on Landfill Sites 3 and 5, and other sites at MCAS Tustin. The second is Mr. Gordon Brown who joined the team two days ago and is replacing Mr. Don Whittaker. He will be responsible for Landfill Sites 2 and 17, the Solvent Study, asbestos remediation, and other cleanup activities.
- Mr. Gould emphasized that there is a lot of environmental cleanup program information available at each RAB meeting on the information table and encouraged attendees to take advantage of all this available information.
- Mr. Gould reminded RAB members and meeting attendees about the MCAS El Toro Information Repository (IR) which is located at the Heritage Park Regional Library in Irvine and the

Administrative Record (AR) file located on-Station at Building 368. He urged attendees to take advantage of these resources. Both the AR and IR contain information and documentation related to the environmental investigation and cleanup at MCAS El Toro. (See page 23 for more IR location information).

- Mr. Gould stated that in response to a request at the last RAB meeting, contact information for Mr. Steven Sharp, RAB member representing the Orange County Health Care Agency, is available on the information table.
- Mr. Gould said that Ms. Nicole Moutoux [(415) 972-3012] and Ms. Viola Cooper [(415) 972-3243], both of U.S. EPA have new telephone numbers. He encouraged all those in attendance to pick up a "Where to Get More Information" sheet from the information table with the new contact information.
- Mr. Gould stated that in response to questions about the Norwalk Pipeline presentation made at the January 31, 2001 RAB meeting, contact information for Mr. John Rifilato of ITPS, the contractor representing the Defense Energy Support Center, formerly Defense Fuels Supply is available on the information table. His phone number [(562) 921-2271] is available on a copy of his presentation that was excerpted from the January 31, 2001 RAB meeting minutes.
- Mr. Gould said that the public meeting for Sites 18 and 24 was held on November 13, 2001, and the Proposed Plan and the key handouts from that meeting are available this evening. He said it was disappointing that not a single RAB member attended the public meeting. A public notice announcing the meeting was published in the *Los Angeles Times* and the *Orange County Register* newspapers. The Proposed Plan, with a meeting announcement, was also mailed to all recipients on the MCAS El Toro community relations mailing list. The Proposed Plan is very comprehensive and a read through will provide the details of the preferred remedy and other alternatives developed for groundwater cleanup. The 30-day public comment period runs for this Proposed Plan runs through December 7, 2001, so there is still time to provide written comments. In response to a question asked by Ms. Gail Reavis, RAB Member, regarding attendance of representatives from the County of Orange at the public meeting, Mr. Gould said that there were no representatives from Orange County.
- Mr. Gould stated that Ms. Rudolph, on behalf of the RAB Subcommittee, had requested a map that identifies all the MCAS El Toro locations where samples were collected with contaminants above maximum contaminant levels (MCLs). This map that shows the compiled data will be provided at the January 30, 2002 RAB meeting.

RAB Subcommittee Meeting Report, Ms. Marcia Rudolph, RAB Subcommittee Chair

Ms. Rudolph discussed the key issues that are of concern to the RAB Subcommittee. Following her presentation of the issues she led RAB members and meeting attendees in the Pledge of Allegiance. Below is a synopsis of the key issues:

- The RAB Subcommittee is interested in seeing a map of the sites that were used to determine background radiation levels for MCAS El Toro that were used in the Radiological Survey.
- Dr. Michael Brown, consultant to the City of Irvine, provided copies of a printout from the Web site of the Center for Public Environmental Oversight that has been disseminating information on the Department of Defense's BRAC budget. According to this Web site, the budget for Department of the Navy BRAC funding is down approximately two-thirds for Fiscal Year 2002 from the previous fiscal year. She said that the RAB Subcommittee is concerned and would like to know what impact this will have on MCAS El Toro.
- She said that the Board of Supervisors has passed a resolution to encourage the acceleration of the development of Alton Parkway Extension, which is a complicated issue relative to the Site 2

Landfill and the Borrego Canyon Wash. She explained that the City of Lake Forest, the City of Irvine, the County of Orange, and the Navy are collaborating on this issue. The goal is to ensure that the placement of the parkway pillars at the perimeter of the Site 2 landfill is done in a way that will not cause problems with breaching of the landfill remedy once the land is transferred. Ms. Rudolph explained that it is important to state this so this issue is included in the record for this meeting.

- Ms. Rudolph provided copies of two letters from The City of Irvine regarding Building 307 expressing concerns for possible downgradient movement of contaminants. Mr. Hurley asked that the RAB attendees be provided with the letters and that a copy be furnished to Mr. Bob Coleman, Navy CLEAN Community Relations, to be placed in the Administrative Record and Information Repository.
- She said that after reading the U.S. EPA letter provided at the last RAB meeting, the RAB Subcommittee understands that the agency views perchlorate as a hazardous pollutant. Specifically, the RAB Subcommittee has concerns regarding the perchlorate plume that is originating from the Site 1 EOD Range. These include: who will be monitoring that plume after the property transfer to the FBI has taken place; and how the plume will be handled if it migrates to a location off of the transferred property.
- The RAB Subcommittee has not yet seen a real response to the City of Irvine Solvent Study. She said that the RAB Subcommittee is interested in seeing the documentation of all of the information that the Navy has used in supporting its response to the study. She added that there are a lot of people who feel that the Solvent Study was very well done.
- The RAB Subcommittee is interested in information on the sanitary sewer line that extends from Building 307, specifically where it hooked into the sewer system and at the former sewage treatment plant.
- The RAB Subcommittee has some concerns regarding the timeline for the MCAS El Toro Environmental Impact Statement (EIS). She said that at a scoping meeting held approximately 4 years ago, it was stated that the EIS would be based on environmental information from 1991. Since 1991, however, the bases has been closed and there have been many discoveries and a lot of research. Thus, the Subcommittee is interested to know about the timeline for the EIS; specifically, if 1991 will continue to be the baseline date to assess environmental issues pertaining to MCAS El Toro.
- The Subcommittee is interested in the response to the U.S. EPA's concerns regarding the reporting of uranium (U238) and (U235), as far as what has been detected and the results as they pertain to what should be found in the groundwater analysis.
- There is still concern about the JP-5 issue coupled with the solvent issue.
- The Subcommittee has some concerns with the fact that Dr. Chuck Bennett had seen a couple of hits of 1,2-DCA at Site 16. The Subcommittee would like information to follow-up the concern raised on this issue.
- The Subcommittee is interested in the status of the County of Orange's involvement in the oversight of the remedial actions for Tank Farm 555.
- Ms. Rudolph stated that she is submitting a copy of a letter sent by the City of Lake Forest to the RWQCB Santa Ana Region concerning the National Pollution Discharge Elimination System) NPDES permit. She said that this letter provides information on the substantive changes in the NPDES permit and a sense of the degree of the pressure this issue is placing on local entities. The City of Lake Forest has already spent over \$700,000 on this issue thus far this fiscal year. The RAB Subcommittee would like to know the status of the NPDES permit for MCAS El Toro, if the base permit is being reviewed and revised to the extent of other local permits, and how the Navy is currently addressing this issue, prior to any property transfer taking place. She stated

that this will probably become a major issue for the Navy since it is such a big issue from a city standpoint. She added that this issue will obviously involve the drainage washes at the Station, and that Site 25 may need further evaluation despite the No Further Action Record of Decision. Ms. Gail Reavis, RAB member and City Councilperson for Mission Viejo, added that the Subcommittee wants to make the Navy aware of the recent urgency and importance of this issue as well as the cost factor involved and the new permit requirements. Ms. Rudolph explained that there also appears to be some tug and pull between the federal regulations, the Clean Water Act (CWA), and implementation of new regulations by the local water boards. She said that there is a scheduled meeting on 12/19/01 to address these issues with the RWQCB. A copy of the letter was provided for placement in the RAB meeting public information materials package for this meeting that will be placed in the Administrative Record and the Information Repository.

Discussion

Mr. Don Zweifel, RAB member, said that he is concerned that the Navy is running out of money for remediation and if the Navy will be able to do the restoration work that needs to be done at MCAS El Toro. Ms. Rudolph said that the RAB Subcommittee's perspective is the concern for any transfer to the County before remediation is conducted and that County taxpayers should not have to front the cost to remediate 50 years of a national military asset that was located in our community.

Mr. Gould replied that he has seen the e-mail about the Department of Defense budget figures mentioned earlier and it does show the Navy's BRAC budget going down next year. He said that there are a few important aspects to keep in mind regarding these figures. First, the BRAC budget should be going down because the workload is decreasing as bases are being closed out and transferred. Secondly, funding for projects in a specific fiscal year carries over into the next year. For example, the designs for the landfill remedies take approximately 2 years, so the funding will carry over. He said to be careful not to focus on a particular budget figure because it does not take into account the entire budget picture. Mr. Gould added that the program budget for the Installation Restoration (IR) program for MCAS El Toro is a little over \$18 million for this year and the base should be fully funded for that amount.

NEW BUSINESS

◆ Dr. Chuck Bennett Memorial Award for Outstanding Service to the MCAS El Toro Restoration Advisory Board – Dean Gould

Mr. Hurley stated that approximately a year ago the RAB voted to honor Dr. Charles Bennett for his great service to the community with an annual award recognizing the service of a RAB member who has demonstrated the same zeal and commitment that Dr. Bennett displayed. The plaque reads: *"For your dedicated and faithful service conducted in the spirit of Dr. Bennett's unwavering devotion to the Installation Restoration Program and Restoration Advisory Board for Marine Corps Air Station El Toro. Your voluntary efforts on behalf of the Marine Corps and the local community, to assure the protection of human health and the environment and rapid cleanup and conversion of the Station are truly appreciated."* The plaque is signed by Colonel Danny J. McDaniel, Chief of Staff, United States Marine Corps. Mr. Hurley said that after very little deliberation, it was obvious who the award should go to – Ms. Marcia Rudolph.

Mr. Gould said, *"Ms. Rudolph is certainly the right person to receive the award. She is doing her job extremely well, and I encourage her to keep it up and I encourage you (other attendees) to step up to her*

level of effort. I think it is outstanding and you should be proud of the job she is doing and we welcome it and encourage more people to get involved with not only the RAB but the Subcommittee as well. I know it is not easy, especially now with your additional duties of being on the city council. It is a definite challenge to keep up with all the documents, but on behalf of the Navy, we appreciate all your voluntary efforts to keep supporting this program."

Upon receiving the award Ms. Rudolph said, "Chuck Bennett was an incredibly unique and marvelous man who exemplified that spirit of total voluntarism that goes with our nation. A number of years ago I went to a meeting to speak about a voluntary organization I belonged to. They had a visiting member who was from Sweden. After I completed my presentation, his comment was 'how much do they pay you for doing all of this?' Because in Sweden, anything that we would view as a volunteer effort, the government pays such people to do it. We think of it as volunteer work. It's the spirit of our country. Chuck Bennett certainly exemplified it in what he did for his city and for all of us in Orange County relative to the RAB, and he certainly made all of us smarter and more perceptive, and lit a fire under all of us to keep up this work. Thank you very much. I appreciate it."

◆ Regulatory Agency Comment Update

Nicole Moutoux, Project Manager, U.S. Environmental Protection Agency (EPA) Region IX

Ms. Moutoux said that she will summarize the four letters that are out on the information table. The first letter is comments on the Draft Final Focused Feasibility Study for Site 16. The main U.S. EPA comments are a request for the Navy to provide a greater range of alternatives for a groundwater remedy and more justification for closing out the Vadose Zone at Site 16. The second letter is an approval of an extension request for the Draft Final Record of Decision (ROD) for Sites 3 and 5 from November 2001 to February 2002. The third letter is comments on the Work Plan for the Aquifer Test at Landfill Site 2. The main U.S. EPA comment was a request for justification of the duration of the test; the Navy is proposing a long duration for running the test. She said that the last letter is comments on the Draft Technical Memo for Reevaluation of Risk at Sites 8, 11 and 12. She said that there is a sense that risk that still remains for this site and that risk needs to be addressed.

Ms. Reavis stated that the U.S. EPA comments on the Draft Technical Memo for Sites 8, 11 and 12, are not really dazzling. Ms. Moutoux explained that there may be some misunderstanding from the beginning about the reason for the reevaluation. The U.S. EPA feels that there is still some risk that needs to be addressed, but the cleanup levels in the ROD are too low and need to be more reasonable. She said that the Navy and U.S. EPA are not really that far apart on determining an outcome for these sites. Dr. Brown asked what is meant by the cleanup numbers being too low. Ms. Moutoux replied that the low cleanup levels are based on old toxicity values that were set very low. She explained that the risk is not as great as was originally thought when those toxicity values were set, so the cleanup levels need to be revised based on the latest scientific findings.

Mr. Zweifel said that regarding IRP Site 8, the Navy did not collect any additional data on these units and the risk did not change significantly due to the new toxicity values. He stated that the hazard index remains above one, due mainly to PCBs. He asked for an explanation of the comment that the U.S. EPA is not convinced of the rationale provided by the Navy for NFA. Ms. Moutoux replied that from the beginning there was an overestimation of risk, but there is some risk due to PCBs. She said that PCBs are one of those persistent contaminants that cannot be left on the site, so some action is necessary, but not necessarily to the level originally included in the ROD. She added that part of the

reason for developing this technical memorandum was to explore the best way to deal with these sites.

Triss Chesney, Project Manager, Cal-EPA Dept. of Toxic Substances Control (DTSC)

Ms. Chesney said that DTSC has two letters available on the information table this evening. The first letter is approval of a FFA extension request for submittal of the Draft Final ROD for Landfill Sites 3 and 5. The second letter is comments on the Draft Work Plan for the Aquifer Test at Landfill Site 2. She said that in general, DTSC is asking the Navy to characterize the nature and extent of contaminants in groundwater and then submit that for regulatory review before proceeding with the aquifer test. Additionally, the Navy has been asked to clearly identify and evaluate the existing hydrogeologic information that was obtained during the remedial investigation and how the results of the proposed aquifer test will supplement the modeling based on the existing information

Patricia Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (RWQCB)

Ms. Hannon said that there are seven letters from the RWQCB available on the information table this evening. After a general summary, she was asked to provide the date of each letter provided. Brief summaries of each follow:

- Letter dated October 11, 2001 with comments on the Closure Report for the JP-5 pipeline. The RWQCB has requested additional information regarding review of maintenance records for the pipeline, and has suggested that if there is any indication of past fuel releases based on the records, that those releases should be investigated and evaluated in the closure report.
- Letter dated October 11, 2001 concurring with the No Further Action (NFA) decision on the Addendum to the Site Assessment Report on the Firefighter Burn Pit MSC B-1.
- Letter dated October 11, 2001 concurring with the NFA decision on the Addendum to the Summary Report for Aerial Photograph Anomaly (APHO) Areas 5, 31, 43, 66, and 68.
- Letter dated October 17, 2001 concurring with the resampling of the well pairs recommendation in the Draft Technical Memo for Replacement Wells Installation and Groundwater Evaluation that addresses groundwater monitoring wells at Sites 3, 4, 5, 7, and 24.
- Letter dated October 17, 2001, that the RWQCB does not have any comments on the Draft Technical Memo, Phase II Radionuclides in Groundwater at Former Landfill Sites and the Explosives Ordnance Disposal (EOD) Range.
- Letter dated October 17, 2001, with comments on the Draft Work Plan for the Site 2 Aquifer Test. She said that the comments are mostly requesting clarification and additional information regarding the placement of the treatment system and the discharge of treated water.
- Letter dated October 29, 2001, that concurs with the NFA recommendation stated in the Technical Memo for Preliminary Assessment, Building 307.

Discussion

Mr. Zweifel asked for clarification of the general permit order 96-18 and discharge authorization 96-18-181. Ms. Hannon replied that for MCAS El Toro a general groundwater cleanup permit was issued in 1996 for sites that have certain solvents and petroleum contamination. She explained that when a particular site is placed onto that permit, numbers are added to the end of the permit number. Site 16 was placed under permit 96-18 to allow discharge of treated water from the pilot study. In responses to a questions from Mr. Zweifel, Ms Hannon replied that sampling was done on the treated water to make sure it was in compliance.

Mr. Hurley while referring to RWQCB's October 11, 2001 letter on JP-5 compliance, asked if RWQCB is asking the Navy to analyze the maintenance records. She said that the RWQCB's perspective is whether the pipeline has had environmental impact, and whether the maintenance records were examined for this impact. Therefore, the Navy is being asked to actively review the maintenance records for the pipeline.

Dr. Brown asked, regarding the findings for the Site 2 Aquifer Test, if an assumption is being made that perchlorates are originating from Site 1, or is it possible that the perchlorates are originating from Site 2. Ms. Hannon replied that Site 2 is downgradient from Site 1, and that no assumptions are being made about where the perchlorates are coming from. Dr. Brown asked if by conducting the aquifer test, if there is any way to determine the origin of the perchlorates. Mr. Gould replied that that question would be answered later during the presentation.

◆ **Site 2 and 17 Landfill Cap Design/Alton Parkway Extension, Crispin Wanyoike, Earth Tech, Inc.**

Mr. Gould said that Sites 2 and 17 have gained a lot of interest recently due to their proximity to the proposed Alton Parkway Extension, inclusion in the wildlife habitat, and the ongoing design phase for the landfill caps. Mr. Wanyoike stated that he will be providing an update on the remedial design for Sites 2 and 17, will answer questions regarding the Site 2 aquifer testing, and discuss the coordination between the Navy and the County of Orange regarding the Alton Parkway Extension.

Background

Site 2, Magazine Road Landfill, is located between one of the tributaries of the Borrego Canyon Wash consisting of approximately 27 acres. It was used as the Station landfill from the 1950s to the 1980s. Site 17 is slightly smaller and is located in a small canyon to the west of Site 2. It was in use from 1970s to 1986. Both sites have undergone the Remedial Investigation and Feasibility Study phases of the Installation Restoration Program, and Interim RODs have been signed for both sites. Both sites include some areas where debris were disposed of that are adjacent to the landfills. The remedy design includes consolidation of these areas under the landfill cap.

Selected Remedy

Mr. Wanyoike said that the cap system design calls for 4 feet of cover soil to prevent erosion and infiltration from rainfall and percolation of water through the landfill. He said that there will be restrictions on access to the site and digging will be prohibited. Mr. Hurley asked how the restrictions will be addressed since this is a federal agency-to-federal agency transfer. Mr. Wanyoike replied that a memorandum of understanding will address the application and enforcement of the restrictions. Both sites are also California gnatcatcher habitat areas so mitigation of these areas will be performed after installation of the caps. In addition, the landfill caps will be planted with natural grasses. Preparation of a biological assessment of the wildlife areas at the sites is currently underway. This document will be submitted to the U.S. Fish and Wildlife Service (USFWS) for review and the agency will then prepare a biological opinion.

Schedule

Mr. Wanyoike stated that the 60% Design Submittal was issued the week of November 12, 2001. The 90% Design Submittal is scheduled for submittal in February 2002, with the final design

scheduled for submittal in May 2002. He stated that construction is expected to start in June 2002 and be completed in January 2003.

Design Overview

Mr. Wanyoike said that the 60% Design Submittal defines implementation of the landfill cap, including the type of soil, the thickness of the soil (4 feet), and all the drainage structures. There are five components that comprise the 60% Design Submittal:

- Basis of the Design Report that elaborates on all the criteria.
- Engineering Plans that show the grading and placement of fencing.
- Hydraulics and Hydrology Report that looks at the flows in the Borrego Canyon Wash and in and around the landfill to determine if there will be any impact to the soil cap. This component evaluates the need for diversion of any flow that would come onto the landfill.
- Technical Memorandum presenting the results of the pre-design investigation that was completed about a year ago.
- Response to comments received on the 30% Design Submittal. Comments were received from 15 different organizations, and responses to each of those comments are included in an appendix to the 60% Design Submittal.

Mr. Wanyoike stated that there were a few major comments received during the comment period for the 30% Design Submittal. The major comment was a request to revise the cap design to use the maximum credible earthquake in the seismic design criteria for the landfill. He said this is mainly an issue at Site 2, since the landfill is in the Borrego Canyon Wash and has liquifiable soils. Therefore, the design criteria needs to incorporate measures to prevent the landfill mass from moving into Borrego Canyon Wash. He said that in order to do a good evaluation of the maximum credible earthquake, a supplementary investigation is being conducted to evaluate how much, if any, liquefaction would occur and what the effects of liquefaction would cause. The field work for this investigation will start the week of December 3, 2001, with results included in the 90% Design Submittal. He explained that comments were also received that pertained to landfill gas, construction quality assurance, which regulatory agencies would provide oversight, and the schedule for reports submittal to the RWQCB for construction oversight.

Mr. Wanyoike stated that four meetings between the County, interested developers, the City of Lake Forest, and surrounding communities have taken place to address coordination work for the Alton Parkway Extension. He said that some of the remaining major design issues include the flows through Borrego Canyon Wash, and if those flows would have a detrimental effect on the roadway extension once the landfill cap is in place. An evaluation of the flows through Borrego Canyon Wash is included in the 60% Design Submittal. The document also includes an evaluation of "scouring," which is how much erosion will take place along the banks of the wash, with a prediction of what effect that would have on the roadway extension. He said this evaluation has been submitted to the County of Orange for their comments, and responses to those comments and issues will be addressed in the 90% Design submittal. Mr. Wanyoike explained that the last Alton Parkway Extension coordination meeting took place on November 8, 2001, and the next scheduled meeting is to be held in March 2002, shortly after release of the 90% Design Submittal.

Mr. Wanyoike stated that there is an additional issue that is part of the design coordination, the California gnatcatcher, which is an endangered species with habitat areas at Sites 2 and 17. A biological assessment of the impact to the gnatcatcher is being prepared, and is anticipated to be submitted to USFWS in December 2001. Following consultations between the Navy and USFWS, a

biological opinion is expected to be issued by this agency in April 2002. The biological opinion will provide monitoring requirements during construction and define any mitigation of habitat losses that will result during landfill cap construction.

Mr. Wanyoike stated that once the 90% Design Submittal is essentially complete and nearly ready for construction. He explained that the 90% Design Submittal will include:

- Basis of Design Report
- Detailed Plans and Specifications
- Hydraulics and Hydrology Report
- Geotechnical Evaluation (incorporating supplemental investigation results)
- Technical Memorandum presenting the results of the Pre-Design Investigation
- Responses to comments received on the 60% Design
- A Construction Quality Control and Assurance Plan
- Contingency Plan to handle issues like encountering drums during waste consolidation.

Discussion

Mr. Fred Meier, RAB member, asked how much investigation was done to determine what is in the landfill. Mr. Wanyoike replied that that was done as part of the Remedial Investigation (RI). The RI used the presumptive remedy approach that does not actually examine the landfill to characterize constituents. He said that with the presumptive remedy, it is assumed that the most effective remedy is to cap the landfill. Therefore, the limits of the landfill were established and tests were run to determine if there is any gas associated with the landfill.

Ms. Ruldolph stated that there is trichloroethylene (TCE) and possibly perchlorate associated with the landfill. She asked if there is any intention of trying to determine what is causing that contamination to occur before the landfill is capped. Mr. Wanyoike replied that the ROD for Sites 2 and 17 is an interim ROD for two reasons. The first reason is the need to complete the Radiological Survey of both sites. The second is the groundwater issue. He said that the Draft Final ROD had monitored natural attenuation of PCE and TCE as the preferred remedy, but there was not enough data to conclusively support that remedy. He explained that the aquifer test and supplemental investigation at Site 2 will help gather enough information to make a decision on the origin of TCE. The investigation will also help determine a groundwater response action, either monitored natural attenuation or active pumping and treating. He said that at Site 1 results indicated that the high perchlorate concentrations were localized at that site. However, verification of how extensive perchlorates are in the groundwater is a further component of the investigation at Site 1.

Ms. Ruldolph asked if methane is a concern. Mr. Wanyoike replied that one of the 60% Design Submittal issues pertained to an active landfill gas collection system. He said that during the RI, emissions from the landfill were calculated. Emissions fall below the threshold that would require an active gas collection system, therefore, the 60% Design Submittal contains a statement to that effect. He added that the site will have perimeter gas monitoring wells that will be part of long-term monitoring of the landfills.

Mr. Jerry Werner, RAB member, asked if the State provides review of the landfill design. Ms. Chesney replied that these sites are CERCLA cleanups, so the design review is lead by DTSC with the Integrated Waste Management Board (IWMB) and the RWQCB reviewing the design as well. Ms. Hannon added that she has reviewed the 30% Design Submittal, but hasn't yet started the review

of the 60% Design Submittal. Mr. Wanyoike added that all the regulatory agencies have a chance to review all the design submittals, and responses are provided to all comments.

Ms. Reavis asked how many total acres on the base will be fenced off and have restricted land use. Mr. Wanyoike replied that for Sites 2 and 17, probably approaching 20 to 30 acres will have fencing and restricted land use. Mr. Gould added for the entire base, the program is not far enough along to determine at this time to determine how much acreage will have restriction. Ms. Reavis asked when will that information will be available. Mr. Gould said that the schedules for the various sites would determine when that information is available. He added that the detailed response to the City of Irvine letter listed everything that in the Navy's opinion may have a restriction. That response also included a color map of all the sites, and was distributed to RAB members. He agreed to provide a copy of this letter to Ms. Reavis.

Ms. Reavis asked if the two caps on the landfills would be certified annually, and what agency will certify them. She also asked how this information would be shared with the community. Mr. Wanyoike replied that along with the issuance of the 90% Design Submittal, a long-term Operation and Maintenance (O&M) plan will be prepared that will provide guidelines for how often the landfill will be inspected. Those inspection reports will be submitted on a semi-annual basis to the regulators and any other interested parties. Ms. Reavis asked which regulatory agency is responsible for the landfill caps. Mr. Wanyoike replied that all the agencies will provide oversight, with the RWQCB being the lead agency.

Mr. Zweifel asked why the regulators are not requiring characterization of these sites. He stated that the presumptive remedy is not necessarily the best remedy. He added that at MCAS Tustin, it was a big mistake to build the Jamboree Road Extension over a landfill. Mr. Gould replied that the Alton Parkway Extension will not be built over a landfill, but is significantly offset to the side. The current coordination with the community representatives is to share concerns of the impact that either the extension construction or the site remedy may have on the other activity in the form of altered water flow and erosion. The Alton Parkway Extension will be located on the other side of the channel with the closest point approximately 300 feet from the landfill. He said that all the documentation showing exactly where and how the remedy is going to be applied has been open to public review. He further explained that the presumptive remedy is actually U.S. EPA guidance. The presumptive remedy rationale is that the remedy is effective as long as it can be demonstrated that the contaminants in the landfill boundary are truly contained. This containment is demonstrated by implementation of a cap and through continuous monitoring to make sure that there are no contaminants escaping to groundwater. The presumptive remedy is a safer remedy and more cost effective than going in and characterizing or excavating the landfills.

Ms. Moutoux added that the presumptive remedy takes into account that in general, landfills are going to be capped and it provides guidelines on how to perform the capping. She said that it is actually a conservative way to cover a landfill, making an assumption that is what is in the landfill actually may be worse than what was disposed of in the landfill. Mr. Meier noted that the 60% Design Submittal has engineering plans, and asked that copies be provided to the RAB. Mr. Wanyoike replied that copies of the 60% Design Submittal were provided to Ms. Rudolph and Mr. Hurley, and there is a copy in the AR and IR. Mr. Gould stated that this is a pretty sizeable document, so it would be cost prohibitive to provide personal copies. However, if Mr. Meier is going to do a thorough review of the document, a copy can be provided, or can it be brought to the next meeting for review. Dr. Brown said that given that the site has not been characterized, even with the

cap, there is significant risk of drums deteriorating and releasing solvents. He asked what the response will be if monitored contaminant levels suddenly rise. Mr. Wanyoike replied that the Navy is responsible for restoring the aquifer if there is a significant amount of contamination that effects the groundwater. Ms. Reavis stated it is her understanding that the Navy is responsible unless someone tampers with the site. Mr. Gould replied that if there are violations of the institutional controls that are in place to the extent that there is impact to the in-place remedy, that possibility would be examined. Mr. Zweifel asked what the soil conditions are at these sites. Mr. Wanyoike replied that these landfill sites are located in a wash, and that most of the soils are silty sands, which pose seismic liquefaction problems.

The following questions are specific to the Site 2 landfill design, but were raised during the Radiological Survey Evaluation presentation.

Ms. Reavis stated that with the current cap in place, how can the Radiological Survey detect what is below the cap. Mr. Gould replied that the current cap is only a temporary remedy. He added that the landfill is being addressed using the presumptive remedy, and the temporary remedy serves to keep all contaminants within the boundaries of the landfill. So the main landfill concern is containment. Ms. Rudolph stated that the only way to contain the landfill contents would be to put something under it. Ms. Reavis added that the landfill has no barriers, and asked what is going to be put between the landfill and Newport Bay. Mr. Gould replied that the remedy would prevent water from getting into the landfill and causing contaminants to migrate. He added that there will also be monitoring, especially downgradient of the perimeter of the landfill.

Ms. Rudolph stated she has concerns that the weight of the cap over time will compress what is underneath and cause serious problems. Mr. Wanyoike replied that some degree of decomposition will occur that results in compression and settling. He explained that groundwater monitoring will detect if any contaminants have worked their way into groundwater. As part of the groundwater and soil remedy, there will be compliance well locations installed in and around the landfill that will help detect any release from the landfill. Ms. Rudolph stated that by the time detection occurs the contamination has already been released. She said that characterization of the landfill would prevent that from occurring. Mr. Wanyoike replied that Site 2 is a special case. He explained that at other landfills lysimeters would be installed that would help detect any migration of contaminants from the landfill down to groundwater. However, at Site 2 the separation between the landfill and groundwater is relatively thin so there is no effective early warning system that can be installed. So groundwater monitoring is the best device to warn of any release from the landfill.

Mr. Hurley stated that in summary, these landfills are located on silty soil, with no membranes to prevent rain from percolating through. Mr. Wanyoike replied that the cap design is called an evaporated cap, and this design minimizes the amount of rainfall that percolates through and includes plants that absorb moisture. He added that the cap is designed to and required to have permeability of 1×10^{-6} centimeters per second. Mr. Hurley stated that you are saying these landfills, that are located in drainages on silty soil, are not going to have water migrating through them naturally. Mr. Wanyoike replied that there will not be any runoff from the top. He added that any runoff from higher elevations will be diverted away from the landfill mass to further minimize the amount of infiltration. Mr. Hurley stated if the cap prevents migration, then you don't need land-use controls. Mr. Gould replied that if a certain safety factor is built into the design, that is not a reason to go out of the way to compromise that design, so restrictions preventing irrigation are necessary. The cap is designed to address whatever natural factors may occur, but additional measures like land-use

controls are still necessary. Mr. Hurley stated that the presumptive remedy is the bare minimum remedy. Mr. Gould replied that the actual details of the design are very site specific, especially in the case of Site 2 where it is such a unique location right in the middle of the channel. Mr. Wanyoike added that the ARARs for these landfills are consistent with the ARARs used for closure of municipal waste landfills, and for Site 2, the design criteria are similar to a hazardous waste landfill.

◆ **Site 1 Explosives Ordnance Range – Remedial Investigation Overview/Draft Final Ordnance Explosives (OE) Work Plan – Eli Vedagiri, Project Engineer, and Buzz Barton, Project OE Specialist, Earth Tech, Inc.**

Mr. Vedagiri said that the Remedial Investigation and OE Range Evaluation at Site 1 is a parallel process to evaluate risks due to past ordnance training activities. The RI focuses on the potential risks to human health and the environment posed by chemicals and the OE evaluation focuses on the potential explosives safety risks. The goal of this investigation and evaluation is to estimate the baseline risks to document current conditions and evaluate response actions.

Remedial Investigation Overview

Mr. Vedagiri stated that Site 1 is approximately 74 acres and is currently secured by a fence and locked gate. The Northern EOD range was used by the military and the Southern EOD range was used by law enforcement agencies including the FBI and Orange County Sheriffs Department. The division of the north and south ranges follows an unpaved road that splits the site in two. He explained that there are three zones that make up the Site 1 EOD range. The first zone is the impact zone where the active EOD training took place. That zone is surrounded by the buffer zone which captured any kick out that resulted from EOD training. Then surrounding the buffer zone is the perimeter.

Mr. Vedagiri stated that the Phase II RI for this site was deferred until July 1999, when the site was officially closed. Currently the RI Work Plan has been completed and a number of assessment activities have also been completed. He noted that since this is an EOD range, additional investigation into the explosive risk is required for this site that is not required at other Installation Restoration (IR) sites at MCAS El Toro under the Navy's IR/CERCLA Program. He said that based on all of the risks evaluated, the response actions will be evaluated taking into account the future reuse of the site.

Mr. Vedagiri provided a brief summary of the assessment activities conducted to date.

- The groundwater investigation has been ongoing since the Phase I RI was completed in 1993. A total of 11 additional groundwater wells were installed from 1996 to 1999. Perchlorate has been identified in one well, MW01, at concentrations above U.S. EPA and DTSC provisional action levels.
- The initial range identification and assessment was conducted by the Army Corps of Engineers. He explained that the last presentation made to the RAB regarding OE went into detail on the range risk rule methodology developed by regulatory agencies and the Department of Defense. This methodology was used as guidance for developing the OE Work Plan, which was released for public review and comment.
- Geophysical survey was completed, anomalies were identified and those anomalies will be evaluated from an explosives safety risk standpoint (OE evaluation) and from a chemical contamination standpoint (RI).

- In support of site transfer, soil sampling took place over a 3.3 acre area. The results indicate that there is no contamination or release that would require a response action. He said that the rest of the 70 acres will be sampled and analyzed similar to the 3.3 acres.
- The Radiological Survey was also conducted at Site 1 (see page 15).
- Biological habitat assessment was also conducted for protecting endangered species habitat for the California gnatcatcher and the Riverside fairy shrimp located in a pond north of the EOD range. Biological monitoring will be required in accordance with USFWS requirements.

Mr. Vedagiri said that the field investigation for the Phase II RI will be implemented in three tiers. Tier 1 will involve shallow soil sampling from the surface down to approximately 7 feet. Groundwater sampling of all 11 wells will be performed to establish baseline conditions since the last sampling event. He said that at that time, data would be evaluated to determine if any additional wells will be required for Tier 3. He said that Tier 2 will overlap with the OE investigation. The OE investigation will involve characterizing OE items to estimate explosives safety risk for the entire site. As part of the OE investigation, the impact to soil from chemical contamination resulting from OE items will be investigated.

Ordinance/Explosives Investigation

Mr. Buzz Barton said that the OE characterization will be conducted under Tier 2 field activities. He said that a site specific OE Range Evaluation Work Plan has been prepared detailing how data will be collected in the field for use in determining the OE hazard at Site 1. For Site 1, the range has been broken down into three areas for evaluation. The first area is the Northern and Southern EOD range. The buffer zone which surrounds the EOD range is the second area, and is typically where kickout from range operations would be found. The third area is the outer perimeter which is along the fence line surrounding the range.

Mr. Barton said that the methodology that will be used for data collection at the Northern and Southern EOD ranges will be probability sampling in one-acre grids. The grids have been pre-established, and are randomly selected based on which grids have the most likely characteristics for finding OE and OE related items. The grids will be trenched and potholed down into an anomaly area to determine the depth, external extent, and contents of the anomaly. This data will then be used to make a definitive characterization of the type of hazards that still remain on the site.

In the buffer zone area, the sampling methodology will be transect lines set up in a radial fashion that would emanate from the center to the outer perimeter. Mr. Barton said that the inner boundary in this area has already been 100% geophysically mapped, and known subsurface anomalies will be sampled for characterization. The transect lines that go through the buffer area will be geophysically mapped with a magnometer device and anomalies will be excavated for characterization.

Mr. Barton stated that the sampling methodology for the outer perimeter will involve both surface and subsurface evaluation. If any OE items are found in the perimeter zone, the evaluation will be extended outside the established range area.

Mr. Barton stated that during the OE characterization potholing and trenching techniques will be conducted. If OE items are encountered a decision tree will be used to identify, characterize, and handle each item found at the site. Once an item has been positively identified as not being OE, but as OE scrap, it can be set aside in an OE scrap pile. Items will also be encountered that will not be ordnance related, and do not have any explosives hazard, which is a different scrap category from OE

scrap. He stated that there may not be any anomalies at the site typical of an explosives hazard. However, as many types of explosives hazard circumstances as possible were defined in the OE Work Plan, and each item will be evaluated on a case-by-case base.

Mr. Barton said that if any OE item is found to be explosive, it will be characterized as either safe to move, or blow in place (BIP). An item that is determined to be unsafe to move is one that is intact enough to still have an explosive handling hazard. If this type of ordnance is encountered, the OE experts that are in the field will make the call determining on whether it is safe to move. He said that if the item is not safe to move, then it is a BIP situation where the item would need to be detonated at the same location. He explained that there are engineering controls described in the OE Work Plan. These controls include special containment structures, typically constructed with sand bags, that would be built over OE items to contain fragments, noise, and shock during detonation.

Mr. Barton stated that in other cases where an item is safe to move, there may still be some explosive compound in the item, but it does not have any firing capability. So those items would be safely consolidated on-site for later disposal action. The on-site consolidation area will be identified in coordination with the Navy prior to the start of field work. There are some areas located at the north end of the range that would be suitable for consolidation, where no visible trenching or potholing activities will take place. He explained that the consolidation area will be defined by sandbags, flags, and signs.

Mr. Barton explained that a list of notifications that would be made in the event of a BIP situation. He said that field personnel will first notify either Mr. Wanyoike or Mr. Vedagiri. The Navy will then be notified of the situation and the decision to move forward and have explosives delivered to the site. He stated that other notifications include the fire department, the site caretakers, the FAA, and the Sheriffs Department.

Explosives accountability is a major issue for the project. Mr. Barton said that a local vendor would deliver the explosives to the site, along with paperwork indicating exactly what has been delivered. After any kind of explosives work at the site, documentation and records would be completed that clearly delineate what was disposed of, how much explosives were used, and the explosive compositions. This data would then be used to verify that what was delivered was used at the site in the disposal operation or removal action. Any explosives that are not used would be returned to the same local vendor.

Mr. Barton provided a flow chart that is included in the OE Work Plan. He said that this flowchart breaks down the decision-making process for OE items, and summarizes the disposal process for the scrap that is encountered at Site 1. He said when an anomaly is characterized, if it is not OE and does not have explosives, the decision process eventually leads to DRMO disposal or recycling. If the item is OE scrap, but looks like an intact piece of ordnance, it will be moved to a consolidation area and then will be demilitarized so that it no longer looks like ordnance. If the item is identified as OE, and if there is even a suspicion that there is an explosives hazard, then the flow chart moves to the safe to move or not decision, and consequently will either be consolidated or BIP. He explained that that any of the various ways the OE items are handled, at the end of the process the items will end up being small pieces of metal that will be turned over to DRMO for recycling.

Schedule

Mr. Barton stated that the Final RI Work Plan was issued on November 29, 2001. The 30-day comment period for the Draft Final OE Work Plan is from November 3, 2001 to December 3, 2001. The Final OE Work Plan will be issued on December 31, 2001. The field investigation will start between January 2 and January 30, 2002, with the Tier 3 activities starting in March 2002.

Discussion

Mr. Werner asked if this is strictly a surface evaluation, and if not how far down will it go. Mr. Barton replied that this evaluation is almost all subsurface with surface surveys in the buffer and perimeter zones. A lot of the surface work such as geophysical surveys has already been done at the site, especially in the Northern and Southern ranges. He explained that the depth will depend on the specific anomaly. It is not necessary to dig the entire anomaly out of the ground, but it is necessary to go deep enough to characterize the anomaly and determine the depth and total extent.

Mr. Werner asked how the anomalies are being detected. Mr. Barton replied that most of this site has been geophysically mapped or has been investigated using a TEM array. He said that the detecting equipment consists of an electro magnetic device, a magnetometer that sends an electronic current into the ground, and then measures the response to that current to determine if there is any metal present. He further explained that radar is too disruptive to use in an OE situation.

Ms. Reavis asked if there have been any comments yet from the District Attorney and the Sheriffs Department regarding the Draft Final OE Work Plan. Mr. Gould replied that they have not yet received comments from these agencies. She also stated that she thought the transfer of this site is for a like use, so why is it so important to identify and address all these OE items if more OE is going to be blown up out there. Mr. Gould replied that Site 1 is part of the CERCLA program and was identified in the Federal Facilities Agreement as an IR program site. He explained that as part of the CERCLA program, the Navy is required to at least investigate and characterize the site. These measures ensure that if there are contaminants out there, there is no exposure threat to the community, and that contaminants are confined to the site boundary and do not have the potential to migrate off the site and further contaminate soil and groundwater.

Ms. Reavis asked if there is any possibility of ordnance at the site containing depleted uranium. Mr. Gould said that based on the historic record search, no items that were used for training at the site contained depleted uranium.

Dr. Brown asked what OE scrap would be left in place. Mr. Barton replied materials that would be left in place would be materials that are not related to an OE characterization. Those materials could include metal debris, lids and rings from 55-gallon drums, anything that is just trash that was buried out there and is not related to OE.

◆ Radiological Survey Fieldwork Update – Bruce Christensen, Roy F. Weston, Inc.

Mr. Christensen stated that the on-site Radiological Survey was completed the first week in November. In addition to the survey, soil samples and radiation swipes of building surfaces were collected. The next step is the evaluation of the data that was collected during the survey. Data evaluation is scheduled for completion in December 2001, and the Draft Radiological Release Report is scheduled for submittal to the regulators by February 2002. He explained that the schedule dates

are based on no need for remediation. However, if remediation is necessary, some of the dates may be delayed.

Mr. Christensen said that surveys of ten sites were completed prior to the September 19, 2001 RAB meeting and were reviewed at that meeting. The remaining four sites have been surveyed since the September 19, 2001 RAB meeting, with the last survey completed the first week of November 2001. He explained that a total of 6.4 million high density survey points were collected. Based on readings above the investigation level, 192 solid samples were also collected.

Mr. Christensen stated that Ms. Rudolph asked earlier about the reference areas used for determining background radiation levels. He explained that in each case background readings were taken upgradient of the site, in areas that would not have the possibility of contamination from anything downgradient.

Mr. Christensen stated that 38 radiological anomalies were found during the sampling process. Most of these anomalies can be described as clearly contributing to the elevated radiation levels received during the survey. The majority of the anomalies are in fact finite well-defined pieces of material (i.e. a label plate, a screw, part of a gauge). However, in some instances, the anomaly was so small, that it could not be found in a scoop of material. In that case, the media was collected and considered to be an anomaly. The largest anomaly found was approximately 3-inches long by 1-inch wide. So the survey is actually dealing with very small objects and very low radiation levels. He said that the majority of the anomalies were found on three sites: at DRMO Yard No.1, 9 anomalies were identified inside the fenced area; at Site 1, the EOD Range, 16 anomalies were identified; and at Site 17, 9 anomalies were identified.

Mr. Christensen presented a survey map that showed the survey area, anomalies identified and sampling locations for each of the sites surveyed. He also provided a summary by site of the radiological survey areas completed since the last RAB meeting, as follows:

- Site 1, EOD Range - Approximately 11 acres surveyed within the burn pit area (10 acres planned); 16 anomalies were found during the collection of more than 580,000 high density survey data points. Samples were collected at all 16 anomaly locations based on readings that were above the investigation level established for the site and analyzed for isotope(s) present. An additional 10 samples were also collected and analyzed.
- Site 2, Magazine Road Landfill - Approximately 25 acres surveyed (20 acres planned); this area was surveyed using mostly utilizing the high-density eight-detector array supplemented by the single-detector backpack equipment. No anomalies were found during the collection of more than 1.3 million high-density data points; 31 samples were collected at locations that were above the investigation level established for the site and analyzed for isotope(s) present. He stated that samples were collected from both sides of the wash and in each of the accumulation areas for this site.
- Site 17 – Approximately 7 acres surveyed (4 acres planned); 9 anomalies were found during the collection of more than 365,000 high-density data point; 55 samples were collected at locations that were above the investigation level established for the site and analyzed for isotope(s) present. He explained that more areas were surveyed using backpack equipment due to brush removal. All the anomalies were concentrated approximately in the middle of the landfill.
- APHO 44 – Approximately 2 acres surveyed (2 acres planned); no anomalies were found during the collection of more than 134,000 high-density survey data points; 2 samples were collected at

locations that were above the investigation level established for the site and analyzed for isotope(s) present.

- Buildings Surveyed – 9 buildings containing more than 200,000 square feet were manually surveyed using stationary and scan survey techniques; several buildings contained areas with survey readings above the investigation level. Each of these areas was surveyed again using a different type of survey instrument, and where necessary, swipe samples were collected as follows: Hangar 295 – 18 swipes collected; Command Museum Complex (Buildings 242, 243 and 244) – 16 swipes collected; NBC Complex (Buildings 787, 1789 and 1803) – 9 swipes collected; DRMO Buildings 319 and 360 – 21 swipes collected. All of these buildings were chosen for the survey based on the operations that took place in these buildings during the life of the base.

Mr. Christensen stated that the next steps are to be determined based on the pending results of solid and swipe sample analysis. First, those results will determine if any areas require remediation. Second, If remediation is required a Radiological Work Plan will be prepared on how to conduct the remediation and then the remediation will be performed. Third, the Draft Radiological Release Report will be completed and issued for review. The Draft Radiological Release Report is being prepared at this time based on no need for remediation. He said that if some remediation is required, the necessary work would be accomplished, and then the report would be completed.

Discussion

Mr. Zweifel asked if the anomalies have been excavated. Mr. Christensen replied that all 38 anomalies found during soil sampling have been removed and are awaiting disposition. He added that none of the anomalies were rounds of ammunition and none of the survey data to date indicates the presence of Uranium 238 (depleted uranium). He explained that on each data point, measurements of counts per minute were taken, and the highest reading was slightly greater than 1,000,000 counts per minute found in only one anomaly. He explained that 1,000,000 counts per minute is actually less than a millirem per hour and Nuclear Regulatory Commission (NRC) requirement for personnel to don dosimetry is two millirems per hour.

Mr. Zweifel stated that he thought that Hangar 295 might have been a maintenance shop for radium dials. Mr. Christensen stated that that was actually Hangar 296. Hangars 296 and 297 were previously surveyed and the radium room in Hangar 296 has undergone remediation. The final report for Hangars 296 and 297 is due to come out in December 2001.

Ms. Reavis stated that the County of Orange asked permission to do some coring at Site 2, and that request was denied. She asked if coring at Site 2 was done as part of the radiological evaluation to see what is down there. Mr. Christensen replied that no coring took place as part of the Radiological Survey. He said that, for the Radiological Survey, an eight-detector or two-detector array or single detector (backpack configuration) was moved along very close to the ground at a slow rate, and a total of more than 1,300,000 data points were collected. He explained that this method only examines approximately 18 inches into the ground surface. Follow-up discussion pertained to the existence of a 6 to 12 inch cap that was already in place at Site 2. Mr. Christensen stated that the survey equipment could detect anomalies beneath the cap, however, any anomalies deeper than 18 inches below the ground surface would not be detected unless they were large.

◆ **Update on Building 307, Soil Gas Sampling – Crispin Wanyoike, Earth Tech, Inc.**

Mr. Wanyoike stated that Building 307 is one of the sites identified for investigation from the Solvent Study based on a significant use of solvent. It is located near the northern boundary of IRP Site 24. The building was used as a dry cleaning facility from 1944 to 1977. He said that as part of the RI at Site 24, soil gas surveys were conducted and those surveys did not identify any significant release of contaminants into the environment.

Mr. Wanyoike stated that the goal of the Building 307 study is to confirm previous conclusions that there has been no significant release of solvents to the environment. As part of this study, soil gas sampling was conducted inside the building, in and around the dry cleaning equipment, and along the sewer line that ran from Building 307 to the former sewage treatment plant. The investigation also included collection of groundwater samples to determine if there are elevated concentrations of Volatile Organic Compounds (VOCs) in the groundwater.

Mr. Wanyoike stated that this investigation was conducted in September 2001. He explained that the sampling technology for the soil gas sample collection uses equipment that pushes a probe to the sampling depth. The probe has a perforated section at the end, so that a gas sample can be extracted through the probe with a vacuum device then collected in a sealed bag. The sample is then analyzed at a mobile laboratory on site. He said that for groundwater, the sampling was conducted using hydropunch technology that uses a 40-ton truck to push a probe down to 100 feet. This probe has a perforated section that allows water to flow into the probe and up to the surface for collection. The groundwater samples were also analyzed at the mobile laboratory on site.

Mr. Wanyoike stated that 84 shallow soil gas samples were collected. He explained that shallow samples range from 5 to 20 feet, and that anything deeper is classified as a deep soil gas sample. The majority of the shallow gas samples were analyzed for VOCs in the field using a mobile laboratory. However, 10% of the samples were also sent to a fixed laboratory for confirmation of the results from the mobile field laboratory. Four hydropunch groundwater samples were collected at three locations. He explained that the regulators expressed concerns with areas where there were high soil gas concentrations of VOCs, so seven soil samples were collected in those areas to confirm that there was not any significant contamination.

Mr. Wanyoike stated that the presentation handout contains a map showing all the sampling locations and the results from the sampling events. There is also a map in the handout that shows all the sampling locations along the sewer line. He explained that there are 20 separate locations inside Building 307 and 15 along the sewer line. He explained that in particular, if elevated soil gas concentrations were encountered along the sewer line, deeper soil gas samples were collected at those locations.

Sampling Results

Mr. Wanyoike said that 4 of the 76 shallow soil gas samples collected had concentrations greater than 1 µg/L (micrograms per liter). Compounds detected were Freon 12, Freon 113, toluene and xylene. Eight of the soil gas samples submitted to the fixed laboratory also had concentrations below 1 µg/L. He explained that due to the stability of conditions at the fixed laboratory, concentrations below 1 µg/L can be detected. He said that 5 of the 12 deep soil gas samples submitted to the mobile laboratory had concentrations above 1 µg/L. Most of the soil gas samples collected along the sewer lines were less than 1 µg/L. He stated that two higher concentrations were encountered along the sewer line very close

to Building 307, and those concentrations were of Freon 12 and Freon 113. As samples got closer to the groundwater, Freon 12 and Freon 113 dissipated. He explained that the TCE in the samples is coming from groundwater rather than from a release at the surface.

Mr. Wanyoike stated that soil samples were collected from seven locations. None of the soil samples collected had any reportable concentrations of VOCs. He explained that there was one location along the sewer line where acetone was detected at 19 µg/L, but this concentration is still below the reporting limit.

Mr. Wanyoike said that the groundwater from the hydropunch samples was collected in three different locations: upgradient of Building 307; right in the middle of the building; and downgradient of the building. The concentrations range from 4 to 10 µg/L which is consistent with concentrations in the regional groundwater. The soil gas samples were collected at locations where it was most likely that releases from leaking equipment or from a leaky sewer might have occurred. He stated that the conclusion from the investigation is that there has been some release of VOCs to the environment, but not at a significant level. Therefore, the recommendation for this site is no further action (NFA). He explained that the regulators reviewed the technical memorandum for this investigation, and all concurred with no further action.

Discussion

Mr. Zweifel said based on the handout it looks like TCE was found along the sewer line at the 160 foot level at a concentration of 8.4 micrograms per liter (µg/L), which is above the maximum contaminant level (MCL). Mr. Wanyoike replied that sample is a groundwater hydropunch sample and that the groundwater at Building 307 is part of the TCE plume that originates from Hangars 296 and 297. Most of the concentrations of TCE in groundwater at Building 307 are in the 10 to 15 µg/L range.

Mr. Zweifel stated that the Freon 12 concentration of 130 µg/L is rather high. Mr. Wanyoike replied that Freon was used on-Station and there are very low concentrations of Freon contamination in the groundwater plume. Mr. Wanyoike replied that to put this in perspective, there has been some release, but it is not a significant release into the environment.

Dr. Brown stated that a second letter from the City of Irvine regarding the "Draft Technical Memorandum, Preliminary Assessment, Building 307" was sent out yesterday (letter dated November 26, 2001) that covered some of the City's concerns with Freon 113. He explained that Freon 113 should be referred to as the generic CFC 113. He said that CFC 113 has been used as a dry cleaning solvent since the 1950s. It is not as commonly used as PERC (perchloroethene), but chances are it has been used in that dry cleaning facility along with PERC. The other issue about CFC 113 is that it is extremely volatile; much more volatile than PERC. He explained that with Building 307, releases would have essentially ended in 1977, so CFC 113 would not be expected to be present in soil gas samples. So there may have been a significant release in the past that has in essence volatilized.

Dr. Brown stated that the second City of Irvine letter also references the 13th round of groundwater monitoring where there was a pretty high concentration of CFC 113 in groundwater at Site 12. He stated that this high concentration does not appear to be downgradient from any typical source of solvent and this could very well be consistent with a release of CFC 113 from Building 307 to the sewer system that traveled to the former sewage treatment plant.

Mr. Wanyoike stated that the high concentration that Mr. Brown is talking about is probably from monitoring well MW48 at Site 12 which had a concentration just over 200 µg/L of CFC 113. He said that there is a chance that it made its way to the sewage treatment plant and then found its way to groundwater, but this issue will have to be further investigated. He said that he is still proceeding with the belief that this high CFC 113 concentration at Site 12 is not associated with Building 307 but has possibly come from another location. He added that the sampling methodology and equipment used for this study was capable of detecting CFC 113 from soil gas samples, so if it had been released along the sewer line from Building 307 to the sewage treatment plant, the soil gas samples that were collected and analyzed would have contained detected concentrations of CFC 113. He also stated that the high concentration of CFC 113 in groundwater at Site 12 will be examined further. However, right next to Building 307 CFC 113 was detected in groundwater at a very low concentration, with a maximum of approximately 4 or 5 µg/L. He added that this CFC 113 sampling result does not change the conclusions of the preliminary assessment (i.e. that there had not been a significant release of VOCs to the environment from activities conducted at Building 307 and along the sewer line segment). So essentially, this issue will require further examination and a response will be provided at a future meeting.

MEETING EVALUATION AND FUTURE TOPICS

Meeting evaluation by RAB members:

No suggestions were provided regarding tonight's meeting.

Suggestions for future presentation topics include:

- NPDES Permit Discussion.
- Solvent Study Response
- Funding Issues
- Environmental Impact Statement (EIS) Timeline
- Irvine Desalter Project Update

Mr. Gould stated that the Community Relations Plan for MCAS El Toro will be updated in the near future. The Navy will be putting together a fact sheet that summarizes the entire MCAS El Toro IR program. A survey will be included in the fact sheet asking for community input that will be used to update the Community Relations Plan.

CLOSING ANNOUNCEMENTS/FUTURE MEETING DATES

Upcoming RAB Meeting and Public Meeting

The next RAB meeting will be held on January 30, 2002 in the regular meeting location – Irvine City Hall, Conference and Training Center (CTC), One Civic Center Plaza, Irvine.

Recent RAB Subcommittee Meetings

- Wednesday, 11/28/01, at Room L-104, Irvine City Hall, before the RAB meeting.

The 54th meeting of the MCAS El Toro Restoration Advisory Board was adjourned at 9:38 p.m.

Attachments:

- Sign-in sheets from 11/28/01 RAB meeting.

Handouts provided at the meeting:

- RAB Meeting Agenda/Public Notice – 11/28/01 RAB meeting.
- Meeting Minutes from the September 19, 2001 RAB Meeting – 53rd RAB.
- MCAS El Toro RAB Subcommittee Meeting Minutes, May 30, 2001 meeting.
- MCAS El Toro RAB Meeting Schedule, Full RAB and RAB Subcommittee (Sept. 2001 – July 2002).
- MCAS El Toro RAB Mission Statement and Operating Procedures.
- MCAS El Toro Restoration Advisory Board – Membership Roster, Revival November 2001.
- RAB Membership Application – MCAS El Toro RAB.
- MCAS El Toro Installation Restoration Program – Mailing List Coupon.
- MCAS El Toro Administrative Record File - Information Sheet (for on-Station access).
- MCAS El Toro Information Repository - Information Sheet.
- MCAS El Toro Where To Get More Information Sheet.
- Internet Access – Environmental Web Sites.
- MCAS El Toro Marine Corps/Navy RAB Co-Chair (address, telephone, fax, e-mail).
- MCAS El Toro - For More Information on Redevelopment.
- Contact information for Steven Sharp, RAB member representing Orange County Health Care Agency.
- Glossary of Technical Terms.
- MCAS El Toro RAB Acronyms and Glossary of Technical Terms.
- MCAS El Toro Base Realignment and Closure Business Plan, Introduction Section, March 2001.
- MCAS El Toro Environmental Compliance Program Location of Concern (LOC) Status Table (November 7, 2001).
- Excerpt from Meeting Minutes from the January 31, 2001 RAB Meeting, 49th RAB – Update on Norwalk Pipeline.
- MCAS El Toro – Proposed Plan – Groundwater Cleanup for Operable Units 1 and 2A – November 2001.
- MCAS El Toro – Public Comment Form – Proposed Plan – Groundwater Cleanup, Operable Units 1 and 2A.
- *Presentation* – MCAS El Toro IRP Site 2 and 17 Remedial Design Update, November 28, 2001, Presented by Crispin Wanyoike, Earth Tech Inc.
- *Presentation* – IRP Site 1 Remedial Investigation Ordnance/Explosives Range Evaluation, MCAS El Toro, November 28, 2001, Presented by Buzz Barton and Eli Vedagiri, Earth Tech, Inc.
- *Presentation* – Status of Radiological Surveys, MCAS El Toro Restoration Advisory Board Meeting, November 28, 2001, Presented by Bruce Christensen, Roy F. Weston, Inc.
- *Presentation* – Preliminary Assessment Building 307 - MCAS El Toro Restoration Advisory Board Meeting, November 28, 2001, Presented by Crispin Wanyoike, Earth Tech Inc.

RAB Subcommittee Handouts and Letters *(provided by Marcia Rudolph, MCAS El Toro RAB Subcommittee Chair)*

- MCAS El Toro Subcommittee Meeting Minutes – 5/30/01 meeting (included with September 19, 2001 RAB meeting mailer; attachment to RAB Meeting Agenda/Public Notice and Meeting Minutes 11/28/01 RAB meeting).
- Emails dated August 23, 2001: From – Lenny Siegel, Center for Public Environmental Oversight, To: Military Environmental Forum; Subject: Department of Defense, Environmental Budget Figures.
- Letter dated October 19, 2001 – To Gerald J. Thibeault Executive Officer, California Regional Water Quality Control Board Santa Ana Region. From: Robert L. Woodings, P.E. Director of Public Works/City Engineer, City of Lake Forest; Subject: Comments on September 12, 2001, Draft Tentative Order No. 01-20 (NPDES No. CAS618030), Orange County Areawide Stormwater NPDES Permit.
- Letter dated November 7, 2001 - To Nicole Moutoux, U.S.EPA, Triss Chesney, CAL-EPA DTSC; Patricia Hannon, Santa Ana RWQCB, Dean Gould, Southwest Division, BRAC Operations Office; From Daniel Jung, Director of Strategic Programs, City Managers Office, City of Irvine; Subject: Additional Comments on the Draft Technical Memorandum, Preliminary Assessment, Building 307, MCAS El Toro (October 22, 2001).

- Letter dated November 26, 2001 - To Nicole Moutoux, U.S.EPA, Triss Chesney, CAL-EPA DTSC; Patricia Hannon, Santa Ana RWQCB, Dean Gould, Southwest Division, BRAC Operations Office; From Daniel Jung, Director of Strategic Programs, City Managers Office, City of Irvine; Subject: Additional Comments on the Draft Technical Memorandum, Preliminary Assessment, Building 307, MCAS El Toro (October 22, 2001).

Agency Comments and Letters - U.S. Environmental Protection Agency (U.S. EPA)

- U.S. EPA Comments on the Draft Final Phase II Focused Feasibility Study and Draft Proposed Plan, OU-3, IRP Site 16, Crash Crew Training Pit No. 2, Marine Corp Air Station, El Toro - To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated September 14, 2001).
- U.S. EPA Comments on Draft Technical Memorandum, Reevaluation of Risk for IRP Sites 8, 11, and 12, Marine Corps Air Station, El Toro, dated August 2001 - To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated September 27, 2001).
- U.S. EPA Comments on Draft Work Plan, Aquifer Test, IRP Site 2, Marine Corps Air Station, El Toro, dated August 2001 - To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated October 2, 2001).
- U.S. EPA Response to FFA Schedule Extension Request for Sites 3 and 5, Marine Corps Air Station, El Toro, dated November 14, 2001 - To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated November 15, 2001).

Agency Comments and Letters - California Environmental Protection Agency (Cal-EPA)

- Cal-EPA, Department of Toxic Substances Control (DTSC) - Comments on Draft Work Plan, Aquifer Test, Installation Restoration Program Site 2, Magazine Road Landfill, MCAS El Toro - To: Dean Gould, BEC, MCAS El Toro; From: Triss M. Chesney, Remedial Project Manager, DTSC (letter dated October 3, 2001).
- Cal-EPA, DTSC - Response to Federal Facility Agreement Schedule for Operable Unit 2C, Installation Restoration Program IRP Sites 3 and 5, MCAS El Toro - To: Dean Gould, BEC, MCAS El Toro; From: John E. Scandura, DTSC (letter dated November 26, 2001).

Agency Comments and Letters - California Regional Water Quality Control Board (RWQCB), Santa Ana Region

- RWQCB - Comments on Draft technical Memorandum Evaluation of OU-1, Alternative 8A with Respect to National Oil and Hazardous Substances Pollution Contingency Plan Criteria, Former MCAS El Toro - To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, SLIC/DoD/AGT Section, Santa Ana Regional Water Quality Control Board, (letter dated October 4, 2001).
- RWQCB - Comments on Closure Report, Location of Concern, MSC JP-5, JP-5 Pipeline Units MSC JP5-1 and MSC JP5-3, Former MCAS El Toro; - To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 11, 2001).
- RWQCB - Comments on Addendum to Site Assessment Report, Firefighter Burn Pit MSC B1, Former MCAS El Toro; - To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 11, 2001).
- RWQCB - Comments on Addendum to Summary Report, Aerial Photograph Anomaly (APHO) Area 5, APHO 31, APHO 43, APHO 66, and APHO 68, Former MCAS El Toro - To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 17, 2001).
- RWQCB - Comments on Draft Technical Memorandum, Phase II Evaluation of Radionuclides in Groundwater at Former Landfill Sites and the Explosive Ordnance Disposal (EOD) Range, Former U.S. MCAS, El Toro - To: Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated August 20, 2001).
- RWQCB - Comments on Draft Work Plan, Aquifer Test, IRP Site 2, Magazine Road Landfill, Former U.S. MCAS El Toro - To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 17, 2001).
- RWQCB - Comments on Draft Technical Memorandum - Replacement Well Installation and Groundwater Evaluation, Former U.S. MCAS, El Toro - To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 17, 2001).

- RWQCB - Comments on Draft Technical Memorandum, Preliminary Assessment, Building 307, Former MCAS, El Toro – To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 29, 2001).

Copies of all past RAB meeting minutes and handouts are available at the MCAS El Toro Information Repository, located at the Heritage Park Regional Library in Irvine. The address is 14361 Yale Avenue, Irvine; the telephone number is (949) 551-7151. Library hours are Monday through Thursday, 10 am to 9 p.m.; Friday and Saturday, 10 am to 5 p.m.; Sunday 12 p.m. to 5 p.m. [See next page for Internet sites.]

Internet Sites

Navy and Marine Corps Internet Access – Naval Facilities Engineering Command, Southwest Division, Environmental Web Sites (includes RAB meeting minutes)

www.efds.w.navy.mil/environmental/evnhome.htm

Department of Defense – Environmental Cleanup Home Page Web Site

<http://www.dtic.mil/envirodod/index.html>

Department of Defense - Environmental BRAC Web Site

www.dtic.mil/envirod/brac/

Defense Environmental Response Task Force Web Page

www.dtic.mil/envirodod/brac/dertf.html

Department of Defense- Community Involvement RAB Web Site

www.dtic.mil/envirodod/rab/

U.S. EPA Superfund Web Page

www.epa.gov/superfund/index.html

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
November 28, 2001

RAB MEMBER SIGN-IN SHEET

Name	Signature	Name	Signature
Bell, Richard	⊗	Marquis, Roland	
Britton, George		Marquis, Suzanne	
Chesney, Triss	<i>Triss Chesney</i>	Matheis, Mary Aileen	
Crompton, Chris	<i>Chris Crompton</i>	Mathews, Thomas	
Farber, Dr. Joseph	<i>Dr. Joseph Farber</i>	Meier, Fred J.	<i>Fred Meier</i>
Gould, Dean – Co-Chair	<i>Dean Gould</i>	Olquin, Richard	
Hannon, Patricia	<i>Patricia Hannon</i>	Reavis, Gail	<i>Gail Reavis</i>
Herndon, Roy		Rudolph, Marcia	<i>Marcia Rudolph</i>
Hersh, Peter		Sharp, Steven	
Hurley, Greg – Co-Chair	<i>Greg Hurley</i>	Werner, Jerry	<i>Jerry Werner</i>
Jung, Dan		Woodings, Bob	
Moutoux, Nicole	<i>Nicole Moutoux</i>	Zweifel, Donald E.	<i>Donald Zweifel</i>

⊗ Excused Absence

New Attendees
will be added
to the MCAS
El Toro
Mailing List.

MCAS(L TORO
RESTORATION ADVISORY BOARD MEETING
November 28, 2001

NON-RAB MEMBER SIGN-IN SHEET

Other Attendees, Guests

NAME <u>PLEASE PRINT CLEARLY</u>	AFFILIATION	COMPLETE MAILING ADDRESS [STREET NUMBER, STREET NAME, CITY, STATE, ZIP CODE]	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
Marc P. Smits	SWDIV	1230 Columbia St., Ste 80 San Diego, CA	619/532-0793	
Viola Cooper	community involvement U.S. EPA		(415) 972-3243	
Polin Modanlou	County of Orange	10 Civic Center Plaza 2nd floor Santa Ana, 92703	949-262-0423	
TED SIMON	CITY OF LAKE FOREST	23161 LAKE CENTER DR SUITE 100 LAKE FOREST, CA 94630	949 461 3488 949 461 3512	

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to the MCAS
El Toro
Mailing List.

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
November 28, 2001

NON-RAB MEMBER SIGN-IN SHEET

Other Attendees, Guests

NAME <u>PLEASE PRINT CLEARLY</u>	AFFILIATION	COMPLETE MAILING ADDRESS [STREET NUMBER, STREET NAME, CITY, STATE, ZIP CODE]	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
TERRY KIRCHGESSNER	NIVA/CPH04	3486 EBOE ST IRVINE CA 92606	(949) 552-3548	
BRUCE BAUER	USAF (RET)	18882 PARKVIEW TER SAN ANA CA,	(714) 633-9193	
Dharmy Patel	IT Corp	3347 Michelson Dr. #200, IRVINE CA 92612	(949) 660-7576 (949) 474-8309	
SLATT KENN	US NAVY	CSO EL TORO	949 726-2506	
Gene Foster	City of Lake Forest	23161 Lake Center Suite 100 Lake Forest CA 92630	949 461 3490	
Kyle Olewnik	SWDIV	1230 Columbia St. Suite 800 San Diego, CA	619-532-0789	

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MCAS(L TORO
RESTORATION ADVISORY BOARD MEETING
November 28, 2001

NON-RAB MEMBER SIGN-IN SHEET

Other Attendees, Guests

NAME <u>PLEASE PRINT CLEARLY</u>	AFFILIATION	COMPLETE MAILING ADDRESS [STREET NUMBER, STREET NAME, CITY, STATE, ZIP CODE]	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
LORI BUBASH	BECHTEL	MCAS, TUSTIN		
JEFF LANCE	R.F. WESTON	3375 SEACREST DR CARLSBAD, CA	760 720 5291	
Bruce Christensen	R.F. WESTON	388 Seawind Dr Vallejo, CA 94590	707-562- 3460	
Gordon Brown	SWD IV		FAX (619) 532-0780 Office 532-0791	
Raymond O'Connell	Citizen of M.V.		(949) 770-2131	
Lee H. Saunders	SWD NAVFAC	1220 Pacific Highway San Diego, CA 92132	619-532-3100	

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MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
November 28, 2001

NON-RAB MEMBER SIGN-IN SHEET

Other Attendees, Guests

NAME <u>PLEASE PRINT CLEARLY</u>	AFFILIATION	COMPLETE MAILING ADDRESS [STREET NUMBER, STREET NAME, CITY, STATE, ZIP CODE]	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
Convent Arnold	SWDLV	San Diego	619 532 0790	
ELI VEDAGIRI	EARTH TECH	100 W. BROADWAY, #240 LONG BEACH CA 90802	562-951-2042	
Buzz Barton	Earth Tech	1461 E Cooley Drive Ste 100 Colton, CA 92324	909-554-5006	
MICHAEL BROWN	CITY OF LAVINE		949-724-6365	
CRISPIN WANYONG	EARTH TECH		562 951 2057	

MCAS El Toro -- Meeting Schedule
Restoration Advisory Board (RAB)
Full RAB and RAB Subcommittee Meetings

September 2001 – July 2002

RAB Meetings: The Conference and Training Center (CTC) at Irvine City Hall is being reserved for RAB meetings (full RAB) on the last Wednesday of the month, dates are listed below. **Time: 6:30 – 9:00 p.m.**

* Please note that due to the Yom Kippur holiday (begins on Sept. 26th at sundown), the September 2002 RAB meeting and Subcommittee will be on September 19th.

RAB Subcommittee Meetings: Subcommittee meetings will now be on the *SAME DAY* as the full RAB meeting from 5 to 6:00 p.m. in a smaller room. The preferred room is by the Council Chambers, Room L-104. **General Meeting Time: 5:00 – 6:00 p.m. (Room is available from 4:30 to 6:30 p.m.)**

RAB and Subcommittee Meeting Dates	RAB Meeting Room – Conference and Training Center (CTC) 6:30 – 9:00 p.m.	Subcommittee Meeting Room – Room L-104 5:00 – 6:00 p.m.
September 19, 2001	CTC	Room L-104
November 28, 2001	CTC	Room L-104
January 30, 2002	CTC	Room L-104
March 27, 2002	CTC	Room L-104
May 29, 2002	CTC	Room L-104
July 31, 2002	CTC	Room L-104

MARINE CORPS AIR STATION EL TORO
Installation Restoration Program
Restoration Advisory Board Mission Statement and Operating Procedures

This "Marine Corps Air Station (MCAS) El Toro, Installation Restoration Program, Restoration Advisory Board (RAB), Mission Statement and Operating Procedures," replaces the Revised Version dated January 31, 1996. This revised document contains a new section on the RAB Subcommittee, which replaces the old section. The new section is based on modifications made and approved by a majority vote of the RAB members present at the April 21, 1999 RAB meeting with further refinements made at the May 26, 1999 RAB meeting. Modifications incorporated resulted in revising the subcommittee structure so there is now only one RAB subcommittee. (Note: the original Mission Statement document was dated and signed on February 28, 1995.)

The Restoration Advisory Board (RAB) mission statement and operating procedures, herein referred to as "the mission statement and operating procedures", is entered into by the following parties; U. S. Marine Corps (USMC); U. S. Environmental Protection Agency (USEPA), Region 9; California Department of Toxic Substances Control (DTSC), Region 4; and the RAB. Marine Corps Air Station (MCAS) El Toro has developed a Community Relations Plan (CRP) which outlines the community involvement program. The RAB supplements the community involvement effort. A copy of the CPP is available at the information repository located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, CA 92714.

I. Mission Statement of the RAB

a. The mission of the RAB is to promote community awareness and obtain timely constructive community review and comment on proposed environmental restoration actions to accelerate the cleanup and property transfer of MCAS El Toro. The RAB serves as a forum for the presentation of comments and recommendations to USMC, Remedial Project Managers (RPMS) of USEPA, and DTSC.

II. Basis and Authority for this Mission Statement and Operating Procedures

a. This mission statement and these operating procedures are consistent with the Department of Defense (DoD), USEPA Restoration Advisory Board Implementation Guidelines of September 27, 1994, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendment and Reauthorization Act (SARA) of 1986, particularly Sections 120 (a), 120 (f), 121 (f), and 10 U.S.C. 2705, enacted by Section 211 of SARA, and September 9, 1993, DoD policy letter entitled, "Fast Track Cleanup at Closing Installations".

III. Operating Procedures

A. Membership

1. All RAB members must reside in or serve communities within Orange County.
2. Members shall serve without compensation. All expenses incidental to travel and review inputs shall be borne by the respective members or their organization.
3. If a member fails to attend two consecutive meetings without contacting the RAB, or at least one of the RAB co-chairs, or fulfill member responsibilities including involvement in a subcommittee, the RAB co-chairs may ask the member to resign.
4. Members unable to continue to fully participate shall submit their resignation in writing to either of the RAB co-chairs.
5. Total membership in the RAB shall not exceed 50 members.
6. Applications for RAB membership vacancies shall take place as such vacancies occur. Applications will be reviewed and approved by the Base Realignment and Closure (BRAC), Environmental Coordinator (BEC), USEPA, and DTSC along with consultation with the RAB community co-chair. Candidates will be notified of their selection in a timely manner.
7. Each RAB community member is considered equal whatever their position in the community, and has equal rights and responsibilities.

RAB Membership Responsibilities

- a. Actively participate in a subcommittee and review, evaluate, and comment on technical documents and other material related to installation cleanup, all assigned tasks are to be completed within the designated deadline date.
- b. Attend all RAB meetings.
- c. Report to organized groups to which they may belong or represent, and to serve as a mediator for information to and from the community.
- d. Serve in a voluntary capacity.

B. RAB Structure

1. The RAB shall be co-chaired by the MCAS El Toro BEC, and a community co-chair member. The BEC shall preside over the orderly administration of membership business.

2. A community co-chair will be selected by a majority vote of the RAB community members in attendance. Elected officials and government agency staff members of any legally constituted MCAS El Toro reuse groups are excluded from holding the community co-chair position. The community co-chair will be selected annually on the anniversary of the effective date of the agreement.

Community Co-Chair Responsibilities

- a. Assure those community issues and concerns related to the environmental restoration/cleanup program are brought to the table.
 - b. Assist the USMC in assuring that technical information is communicated in understandable terms.
 - c. Coordinate with the BEC to prepare and distribute an agenda prior to each RAB meeting, and for the review and distribution of meeting minutes.
 - d. Assist subcommittees in coordinating and establishing meeting times/locations.
 - e. The community co-chair may be replaced by a majority vote of the RAB community members present at the meeting in which a vote is undertaken.
3. The RAB shall meet quarterly. More frequent meetings may be held if deemed necessary by the RAB co-chairs. The BEC will facilitate in the arrangement of the meetings and notify members of the time and location.
4. Agenda items will be compiled by the RAB co-chairs. Suggested topics should be given to the BEC or community co-chair no later than two (2) weeks prior to the meeting. The BEC shall be responsible for providing written notification to all RAB members of the upcoming agenda and supporting documents, at least two (2) weeks prior to the date, time, and place of scheduled RAB meeting.
5. The BEC shall be responsible for recording and distribution of meeting minutes. Also, the BEC shall collect a written list of attendees at each meeting, which will be incorporated into the meeting minutes. For quarterly meetings, the minutes will be distributed 30 days prior to the following meeting. For more frequent meetings, the minutes will be distributed as soon as possible.
6. A copy of the RAB meeting minutes will be sent to all RAB members. Supporting documents will be available for public review in the information repository and other repositories as identified.
7. RAB members will be asked to review and comment on various environmental restoration documents. Written comments may be submitted individually by a member, or by the RAB as a whole. Written comments will be submitted to the community co-chair on the subject documents within the schedule as provided for regulatory agency comments. The community

co-chair will consolidate comments from RAB members and provide all comments received to the BEC. The BEC will ensure that a written response is provided to the RAB in a timely manner.

RAB Subcommittee

8. On April 21, 1999, the RAB concurred that only one subcommittee is necessary to provide a concentrated focus on environmental cleanup issues. Therefore, the existing relevant subcommittees envisioned in the original "Mission Statement and Operating Procedures" dated February 28, 1995, have been dissolved, and incorporated into one subcommittee.

a. Membership on the subcommittee will be comprised of volunteers from the RAB, or may be selected by the BEC and the community co-chair.

b. The regular bimonthly RAB subcommittee meeting will continue to be scheduled for the last Wednesday of the month alternating with the regular meeting of the full RAB held at Irvine City Hall, Conference and Training Center, Irvine, California.

c. The subcommittee will set their own agendas and meetings and will be open to the public. The subcommittee chair will notify the BEC and community co-chair of all meeting times and places including additional subcommittee meetings other than the regularly scheduled bimonthly subcommittee meeting.

d. The subcommittee will elect a chair. The subcommittee membership may dismiss a subcommittee chair by a majority vote. Subcommittee chair removal is determined at the meeting where removal is addressed by majority vote of the RAB members present.

e. Membership on the subcommittee will include the RAB community co-chair.

f. Subcommittee status will be reviewed annually, in May, to determine if changes are needed or the continued existence is required.

g. The RAB subcommittee may establish ad hoc subcommittees for specific issues and purposes that would focus efforts on a short-term basis.

h. The subcommittee may request the participation, involvement, and advice of regulatory agency members.

9. MCAS El Toro has established an information repository for public documents relating to restoration activities at MCAS El Toro. The repository is located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, CA 92714. RAB members, as well as the general public, are authorized access to any documents, studies or information, which have been placed in the repository or distributed at RAB meetings. The community co-chair will be provided one (1) copy of all draft documents. The subcommittee will be provided up to seven (7) copies of draft documents.

IV. Effective Date and Amendments

a. The effective date of this mission statement and operating procedures shall be the date that the last signatory signs this mission statement and operating procedures.

b. This mission statement and operating procedures may be amended by a majority vote of the RAB members present. Amendments must be consistent with the MCAS El Toro Federal Facility Agreement (FFA), and the statues stated in Part 11 of the mission statement and operating procedures, (Basis and Authority for this Mission Statement and Operating Procedures).

V. Terms and Conditions

a. The terms and conditions of this RAB mission statement and operating procedures, and DONs endorsement thereof, shall not be construed to create any legally enforceable rights, claims or remedies against DON or commitments or obligations on the part of DON, and shall be construed in a manner that is consistent with CERCLA, 10 U.S.C. Section 2705, and 40 CFR Part 300.

VI. Termination

a. This mission statement and operating procedures will be terminated upon completion of requirements as stated in the FFA. However, after implementation of the final remedial design, it may be terminated earlier upon a majority vote of the RAB membership.

VII. Signatories to the Membership Mission Statement and Operating Procedures

IN WITNESS WHEREOF, we have set our hand this _____ day of _____ 1995.

MCAS El Toro BRAC Environmental Coordinator

RAB Community Co-Chair

U. S. Environmental Protection Agency RPM

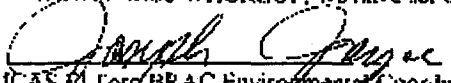
California Department of Toxic Substances Control RPM

The original "Mission Statement and Operating Procedures", dated February 28, 1995, is on file at Marine Corps Air Station (MCAS) El Toro, Environment and Safety. It was signed by Mr. Joseph Joyce, Base Realignment and Closure (BRAC), Environmental Coordinator (BEC), Ms. Marcia Rudolph, Restoration Advisory Board (RAB), Community Co-chair, Ms. Bonnie Arthur, Environmental Protection Agency (EPA), Remedial Project Manager, and Mr. Juan Jimenez, Department of Toxic Substances Control (DTSC), Remedial Project Manager.

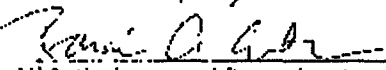
Shown below is an excerpt from the original "Mission Statement and Operating Procedures", dated February 28, 1995 with signatures of the above-mentioned individuals.

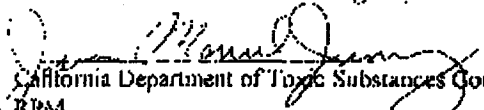
VII. Signatories to the Membership Mission Statement and Operating Procedures

IN WITNESS WHEREOF, we have set our hand this 28th day of FEBRUARY 1995


MCAS El Toro BRAC Environmental Coordinator


RAB Community Co-Chair


U.S. Environmental Protection Agency RPM


California Department of Toxic Substances Control
RPM

MEMBERSHIP APPLICATION

MARINE CORPS AIR STATION EL TORO RESTORATION ADVISORY BOARD

Conditions for membership:

Restoration Advisory Board (RAB) members are expected to serve a two-year term and attend all RAB meetings or designate an alternate. The alternate must be jointly approved by the Department of Defense and Community Co-Chairpersons. If a member fails to attend two consecutive meetings without contacting the RAB, or at least one of the RAB Co-Chairs, or fulfill member responsibilities, which may include involvement with the subcommittee, the RAB Co-Chairs may ask the member to resign. Duties and responsibilities will include reviewing and commenting on technical documents and activities associated with the environmental restoration at **MARINE CORPS AIR STATION EL TORO**. Members will be expected to be available to community members and groups to facilitate the exchange of information and/or concerns between the community and the RAB.

RAB membership priority will be given to local residents that are impacted/affected by the closure of the installation. The number of RAB members is limited.

Name: _____

Address: _____
 Street Suite/Apt. # City Zip

Phone: () _____ () _____ () _____
 Daytime Home Fax

Group Affiliation: _____

1. Briefly state why you would like to be considered for membership on the Restoration Advisory Board (RAB).

(continued on back side)

2. What has been your experience working as a member of a diverse group with common goals?

- 3 Please indicate if you are interested in being considered for the Community Co-Chairperson position on the RAB by checking the space below:

Yes, I would like to be considered. ____

4. Are you willing to serve a two (2) year term as a member of this RAB?

Yes, I am willing- to serve for two (2) years. ____

5. By submitting this signed application, you are aware of the time commitment that this appointment will require of you.
6. By submitting this signed application, you willingly agree to work cooperatively with other members of the committee to ensure efficient use of time for addressing community issues related to environmental restoration of the Station.

Applicant Signature

Date

Please return your completed application to:

Dean Gould
BRAC Environmental Coordinator
Base Realignment and Closure, Environmental Division
P.O. Box 51718
Irvine, CA 92619-1718

(949) 726-5398
FAX (949) 726-6586

San Diego office: (619) 532-0784

MCAS El Toro

Installation Restoration Program

MAILING LIST COUPON

If you would like to be on the mailing list to receive information about environmental restoration activities at MCAS El Toro, please complete the coupon below and mail to:

Base Realignment and Closure
Attn: Environmental, Ms. Marge Flesch
P.O. Box 51718
Irvine, CA 92619-1718

- ☐ Add me to the MCAS El Toro Installation Restoration Program mailing list.
- ☐ Send me information on Restoration Advisory Board membership.

Name _____

Street _____

City _____ State _____ Zip Code _____

Affiliation (optional) _____ Telephone _____

Administrative Record File

- Located at MCAS El Toro – BRAC Office, Marine Way, Building 368, 2nd floor
- Anyone is welcome to review documents in the file
- To view the documents, schedule an appointment by calling:
 - Mr. Dean Gould at (949) 726-5398 or (619) 532-0784
 - Ms. Ms. Marge Flesch at (949) 726-5398

*See the backside for location of the
Information Repository*

Information Repository

- Located at Heritage Park Regional Library in Irvine
- Address: 14361 Yale Avenue, Irvine
- Hours: Monday-Thursday, 10 am to 9 pm
Friday and Saturday, 10 am to 5 pm
Sunday 12 pm to 5 pm
- Phone: (949) 551-7151
- Contains key Installation Restoration Program documents and complete materials from all RAB meetings (agendas, minutes, handouts)
- Anyone is welcome to review documents at the Library

Where To Get More Information:

Copies of Remedial Investigation reports, other key documents, and additional information relating to environmental cleanup activities at MCAS El Toro are available for public review at the following information repository:

Heritage Park Regional Library
14361 Yale Avenue
Irvine, CA
(949) 551-7151

Current hours:
Monday-Thursday 10am-9pm
Friday-Saturday 10am-5pm
Sunday 12pm-5pm

Key Project Representatives:

Mr. Dean Gould*
BRAC Environmental Coordinator
Base Realignment and Closure,
Environmental Division
MCAS El Toro
P.O. Box 51718
Irvine, CA 92619-1718
(949) 726-5398 or (619) 532-0784

Ms. Nicole Moutoux*
Project Manager
U.S. EPA Region IX
75 Hawthorne St. (SFD-H-8)
San Francisco, CA 94105
(415) 972-3012

Ms. Triss Chesney*
Project Manager
Cal-EPA, Department of Toxic
Substances Control
5796 Corporate Avenue
Cypress, CA 90630
(714) 484-5395

Ms. Patricia Hannon*
Project Manager
Cal-EPA, Regional Water Quality
Control Board
3737 Main Street, Suite 500
Riverside, CA 92501-3338
(909) 782-4498

* BRAC Cleanup Team (BCT) Member

Ms. Viola Cooper
Community Involvement Coordinator
Superfund Division
75 Hawthorne Street (SFD-3)
San Francisco, CA 94105
U.S. EPA, Region IX
(415) 972-3243
(800) 231-3075

Ms. Kim Foreman
Public Participation Specialist
Cal-EPA, Department of Toxic
Substances Control
5796 Corporate Avenue
Cypress, CA 90630
(714) 484-5324

Navy and Marine Corps - Internet Access Environmental Web Sites

**N
E
W**

Southwest Division Naval Facilities Engineering Command Web Site:

<http://www.efdswnavfac.navy.mil.environmental/envhome.htm>

Department of Defense - Environmental Web Page

<http://www.dtic.mil/environdod/>

Department of Defense - Environmental BRAC Web Page

<http://www.dtic.mil/environdod/envbrac.html>

U.S. EPA Superfund Web Page

www.epa.gov/superfund/index.html

Marine Corps/Navy RAB Co-Chair

Dean Gould

BRAC Environmental Coordinator

Base Realignment and Closure, Environmental Division

P.O. Box 51718

Irvine, CA 92619-1718

(949) 726-5398

FAX (949) 726-6586

E-mail: goulddda@efdswnavfac.navy.mil

San Diego phone and fax:

(619) 532-0784

FAX (619) 532-0780

For More Information on
MCAS El Toro Redevelopment

Mr. Gary Simon
Executive Director

MCAS El Toro
Local Redevelopment Authority
(714) 834-3000

Steven Sharp

**Environmental Health Division
Orange County Health Care Agency**

**2009 East Edinger Avenue
Santa Ana, CA 92705**

**(714) 667-3623
FAX (714) 972-0749**

MCAS El Toro

Restoration Advisory Board

Acronyms and Glossary of Technical Terms

This handout has been prepared to provide Restoration Advisory Board (RAB) members and others with a better understanding of acronyms and technical terms used during Installation Restoration Program activities and other environmental programs underway at MCAS El Toro.

List of Acronyms

AB	Assembly Bill
accumulation areas	less-than-90-day accumulation areas
ACM	asbestos-containing materials
AC/S	Assistant Chief of Staff
AFB	Air Force Base
AOC	area of concern
AQMP	Air Quality Management Plan
AR	Administrative Record
ARAR	applicable or relevant and appropriate requirement
ASN	Assistant Secretary of the Navy
AST	aboveground storage tank
Basin	the Los Angeles Basin
BCP	BRAC Cleanup Plan
BCT	BRAC Cleanup Team
BEC	BRAC Environmental Coordinator
BFI	Browning Ferris Industries
bgs	below ground surface
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
BRAC III	Base Closure and Realignment Act of 1993
CAC	Citizens Advisory Committee
Cal-EPA	California Environmental Protection Agency
CBCEC	California Base Closure Environmental Committee
CCR	<i>California Code of Regulations</i>
CDM Federal	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CFR	<i>Code of Federal Regulations</i>
CLEAN	Comprehensive Long-Term Environmental Action Navy
CMC	Commandant of the Marine Corps
COE	(United States) Army Corps of Engineers
COMCABWEST	Commander, Marine Corps Air Bases Western Area
COPC	chemical of potential concern
County	Orange County
CP	Compliance Program
CRP	Community Reuse Plan
CTO	Contract Task Order

List of Acronyms

D&M	Dames & Moore
DFSC	Defense Fuel Supply Center
the Districts	the County Sanitation Districts of Orange County
DoD	Department of Defense
DOI	Department of Interior
DoN	Department of the Navy
DRMO	Defense Reutilization and Marketing Office
DTSC	(Cal-EPA) Department of Toxic Substances Control
EBS	Environmental Baseline Survey
ECP	environmental condition of property
EE/CA	Engineering Evaluation/Cost Analysis
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Environmental Office
EOD	explosive ordnance disposal
ETRAP	El Toro Reuse Planning Authority
°F	degrees Fahrenheit
FA	further action
FAA	Federal Aviation Administration
FDS	Federal Disposal Services
FFA	Federal Facility Agreement
FOSL	finding of suitability to lease
FOST	finding of suitability to transfer
FS	feasibility study
ft/day	feet per day
gal.	gallon
GIS	geographical information system
HAS	Homeless Assistance Submission
HRA	Historical Radiological Assessment
HUD	(United States Department of) Housing and Urban Development
IAFS	Interim Action Feasibility Study
IDW	investigation-derived waste
IRP	Installation Restoration Program
IRWD	Irvine Regional Water District
IT	International Technology Corporation
IWTP	industrial wastewater treatment plant
JMM	James M. Montgomery Engineers

LBP	lead-based paint
LDPE	low density polyethylene
LOC	location of concern
LRA	Local Redevelopment Authority
MAW	marine air wing
MCAS	Marine Corps Air Station
MCL	maximum contaminant level
mg/L	milligrams per liter
MSL	mean sea level
NAVFAC	Naval Facilities
NAVFACENGCOM	Naval Facilities Engineering Command
NAVRAMP	Navy Radon Assessment and Mitigation Program
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEDTS	Navy Environmental Data Transfer Standards
NFA	no further action
NEPA	National Environmental Policy Act
NFI	no further investigation
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
OCHCA	Orange County Health Care Agency
OCWD	Orange County Water District
OEA	Office of Economic Adjustment
OHM	OHM Remediation Services Corporation
OSHA	Occupational Safety and Health Administration
OU	operable unit
OWS	oil/water separator
PAH	polynuclear aromatic hydrocarbon
PBR	Permit by Rule
PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
PP	Proposed Plan
ppm	parts per million
PRG	preliminary remediation goal
Project Team	BRAC Project Team
PWC	Navy Public Works Center
QAPP	quality assurance project plan

List of Acronyms

RAB	Restoration Advisory Board
RAC	remedial action contract
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RECLAIM	Regional Clean Air Initiatives Market
RFA	RCRA Facility Assessment
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RWQCB	Regional Water Quality Control Board
SAIC	Science Applications International Corporation
SCAQMD	South Coast Air Quality Management District
SPCC	Spill Prevention and Countermeasure Plan
Station	Marine Corps Air Station El Toro
STP	sewage treatment plant
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
SWMU	solid waste management unit
TAA	temporary accumulation area
TCRA	time-critical removal action
TDS	total dissolved solids
TRC	Technical Review Committee
TSCA	Toxic Substances Control Act
UCL	upper confidence limit
U.S. EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
UST	underground storage tank
VOC	volatile organic compound
WW	World War
XFMR	transformer

ACRONYMS/ABBREVIATIONS

Air SWAT	Air Quality Solid Waste Assessment Test
ASTM	American Society for Testing and Materials
BCT	BRAC Cleanup Team
BEIDMS	Bechtel Environmental Integrated Data Management System
bgs	below ground surface
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
°C	degrees Celsius
Cal/EPA	California Environmental Protection Agency
CARB	California Air Resources Board
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	U.S. EPA Contract Laboratory Program
CNDDB	California Natural Diversity Data Base
COPC	chemical of potential concern
CPT	cone penetrometer test
CTO	Contract Task Order
DC	direct current
DCE	dichloroethene
Desalter	Irvine Desalter Project
DoD	Department of Defense
DON	Department of the Navy
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
EC	electrical conductivity
EOD	explosive ordnance disposal
°F	degrees Fahrenheit
FFA	Federal Facilities Agreement
FID	flame ionization detector
FS	Feasibility Study
FSP	Field Sampling Plan
ft/day	feet per day

ACRONYMS/ABBREVIATIONS (continued)

GC	gas chromatograph
gpm	gallons per minute
GPR	ground-penetrating radar
IAFS	Interim-Action Feasibility Study
IAS	Initial Assessment Study
ID	inside diameter
IDWMP	Investigation-Derived Waste Management Plan
IRP	Installation Restoration Program
L/min	liters per minute
µmhos/cm	micromhos per centimeter
MCAS	Marine Corps Air Station
MeCl	methylene chloride
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
MSL	mean sea level
NACIP	Navy Assessment and Control of Installation Pollutants
NEESA	Naval Energy and Environmental Support Activity
NFESC	Naval Facilities Engineering Service Center (formerly NEESA)
NFRAP	No Further Response Action Planned
NPL	National Priorities List
NTU	nephelometric turbidity units
OCWD	Orange County Water District
OD	outside diameter
OU	operable unit
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
PRG	(U.S. EPA Region IX) Preliminary Remediation Goal
psi	per square inch
psig	per square inch gauge

ACRONYMS/ABBREVIATIONS (continued)

QA	quality assurance
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROICC	Resident Officer in Charge of Construction
RPD	relative percent difference
RWQCB	(California) Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SCAQMD	South Coast Air Quality Management District
SIPOA	Site Inspection Plan of Action
SOP	Standard Operating Procedure
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
SWMU/AOC	solid waste management unit/area of concern
TCA	trichloroethane
TCE	trichloroethylene
TDS	total dissolved solids
TIC	The Irvine Company
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
USCS	Unified Soils Classification System
U.S. EPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VOA	volatile organic analysis
VOC	volatile organic compound
v/v	volume per volume
WSA	waste staging area

ACRONYMS/ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
BCT	BRAC Cleanup Team
bgs	below ground surface
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
°C	degrees Celsius
Cal-EPA	California Environmental Protection Agency
CCR	<i>California Code of Regulations</i>
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (1980)
cfm	cubic feet per minute
CFR	<i>Code of Federal Regulations</i>
CLEAN	Comprehensive Long-Term Environmental Action Navy
cm ³ /g	cubic centimeters per gram
cm/s	centimeters per second
CPT	cone penetrometer test
CTO	Contract Task Order
DCA	dichloroethane
DCE	dichloroethene
DNAPL	dense nonaqueous-phase liquid
DON	Department of the Navy
DTSC	(Cal-EPA) Department of Toxic Substances Control
DWR	(California) Department of Water Resources
°F	degrees Fahrenheit
FFA	Federal Facilities Agreement
FS	Feasibility Study
ft ³	cubic feet
ft/day	feet per day
ft ³ /min	cubic feet per minute
GAC	granular activated carbon
gpm	gallons per minute
HQ	hazard quotient
IAFS	Interim-Action Feasibility Study
ICE	internal combustion engine
IRP	Installation Restoration Program

ACRONYMS/ABBREVIATIONS (continued)

IRWD	Irvine Ranch Water District
Irvine Subbasin	Irvine Groundwater Subbasin
JMM	James M. Montgomery Engineers, Inc.
LGAC	liquid-phase granular activated carbon
LNAPL	light nonaqueous-phase liquid
MCAS	Marine Corps Air Station
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MSL	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NPL	National Priorities List
NPW	net present worth
OCWD	Orange County Water District
OU	operable unit
PCE	tetrachloroethene
PCO	photocatalytic oxidation
POTW	publicly owned treatment works
PVC	polyvinyl chloride
RACER	Remedial Action Cost Engineering Requirements
RAO	remedial action objective
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RWQCB	(California) Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act of 1986
SCAQMD	South Coast Air Quality Management District
SHSO	Site Health and Safety Officer
SITE	(U.S. EPA) Superfund Innovative Technologies Evaluation
STLC	soluble threshold limit concentration

ACRONYMS/ABBREVIATIONS (continued)

SVE	soil vapor extraction
SWDIV	Southwest Division Naval Facilities Engineering Command
SWRCB	(California) State Water Resources Control Board
TAL	target analyte list
TBC	to be considered
TCA	trichloroethane
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
USGS	United States Geological Survey
U.S. EPA	United States Environmental Protection Agency
UV	ultraviolet
VGAC	vapor-phase granulated activated carbon
VES	vapor extraction system
VOC	volatile organic compound
WQCP	(Comprehensive) Water Quality Control Plan (for the Santa Ana Region)



Terms Of Environment

Glossary, Abbreviations, And Acronyms



Introduction

Terms Of Environment defines in non-technical language the more commonly used environmental terms appearing in EPA publications, news releases, and other Agency documents available to the general public, students, the media, and Agency employees. The definitions do not constitute the Agency's official use of terms and phrases for regulatory purposes, and nothing in this document should be construed to alter or supplant any other federal document. Official terminology may be found in the laws and related regulations as published in such sources as the Congressional Record, Federal Register, and elsewhere.

The terms selected for inclusion are derived from previously published lists, internal glossaries produced by various programs and specific suggestions made by personnel in many Agency offices. The chemicals and pesticides selected for inclusion are limited to those most frequently referred to in Agency publications or that are the subject of major regulatory or program activities.

Definitions or information about substances or program activities not included herein may be found in EPA libraries or scientific/technical reference documents, or may be obtained from various program offices.

Those with suggestions for future editions should write to the Editorial Services Division, Office of Communications, Education, and Public Affairs, A-107, USEPA, Washington DC 20460.

Abbreviation and acronymn list begins on page 31

A

A—Scale Sound Level: A measurement of sound approximating the sensitivity of the human ear, used to note the intensity or annoyance level of sounds.

Abandoned Well: A well whose use has been permanently discontinued or which is in a state of such disrepair that it cannot be used for its intended purpose.

Abatement: Reducing the degree or intensity of, or eliminating, pollution.

Accident Site: The location of an unexpected occurrence, failure or loss, either at a plant or along a transportation route, resulting in a release of hazardous materials.

Acclimatization: The physiological and behavioral adjustments of an organism to changes in its environment.

Acid Deposition: A complex chemical and atmospheric phenomenon that occurs when emissions of sulfur and nitrogen compounds and other substances are transformed by chemical processes in the atmosphere, often far from the original sources, and then deposited on earth in either wet or dry form. The wet forms, popularly called "acid rain," can fall as rain, snow, or fog. The dry forms are acidic gases or particulates.

Acid Rain: (See: acid deposition)

Action Levels: 1. Regulatory levels recommended by EPA for enforcement by FDA and USDA when pesticide residues occur in food or feed commodities for reasons other than the direct application of the pesticide. As opposed to "tolerances" which are established for residues occurring as a direct result of proper usage, action levels are set for inadvertent residues resulting from previous legal use or accidental contamination. 2. In the Superfund program, the existence of a contaminant concentration in the environment high enough to warrant action or trigger a response under SARA and the National Oil and Hazardous Substances Contingency Plan. The term is also used in other regulatory programs. (See: tolerances.)

Activated Carbon: A highly adsorbent form of carbon used to remove odors and toxic substances from liquid or gaseous emissions. In waste treatment it is used to remove dissolved organic matter from waste water. It is also used in motor vehicle evaporative control systems.

Activated Sludge: Product that results when primary effluent is mixed with bacteria-laden sludge and then agitated and aerated to promote biological treatment, speeding the breakdown of organic matter in raw sewage undergoing secondary waste treatment.

Activator: A chemical added to a pesticide to increase its activity.

Active Ingredient: In any pesticide product, the component that kills, or otherwise controls, target pests. Pesticides are regulated primarily on the basis of active ingredients.

Activity Plans: Written procedures in a school's asbestos management plan that detail the steps a Local Education Agency (LEA) will follow in performing the initial and additional cleaning, operation and maintenance-program tasks; periodic surveillance; and reinspections required by the Asbestos Hazard Emergency Response Act (AHERA).

Acute Exposure: A single exposure to a toxic substance which results in severe biological harm or death. Acute exposures are usually characterized as lasting no longer than a day, as compared to longer, continuing exposure over a period of time.

Acute Toxicity: The ability of a substance to cause poisonous effects resulting in severe biological harm or death soon after a single exposure or dose. Also, any severe poisonous effect resulting from a single short-term exposure to a toxic substance. (See: chronic toxicity, toxicity.)

Adaptation: Changes in an organism's structure or habits that help it adjust to its surroundings.

Add-on Control Device: An air pollution control device such as carbon absorber or incinerator that reduces the pollution in an exhaust gas. The control device usually does not affect the process being controlled and thus is "add-on" technology, as opposed to a scheme to control pollution through altering the basic process itself.

Adequately Wet: Asbestos containing material that is sufficiently mixed or penetrated with liquid to prevent the release of particulates.

Administrative Order On Consent: A legal agreement signed by EPA and an individual, business, or other entity through which the violator agrees to pay for correction of violations, take the required corrective or cleanup actions, or refrain from an activity. It describes the actions to be taken, may be subject to a comment period, applies to civil actions, and can be enforced in court.

Administrative Order: A legal document signed by EPA directing an individual, business, or other entity to take corrective action or refrain from an activity. It describes the violations and actions to be taken, and can be enforced in court. Such orders may be issued, for example, as a result of an administrative complaint whereby the respondent is ordered to pay a penalty for violations of a statute.

Administrative Procedures Act: A law that spells out procedures and requirements related to the promulgation of regulations.

Administrative Record: All documents which EPA considered or relied on in selecting the response action at a Superfund site, culminating in the record of decision for remedial action or, an action memorandum for removal actions.

Adsorption: An advanced method of treating waste in which activated carbon removes organic matter from wastewater.

Adulterants: Chemical impurities or substances that by law do not belong in a food, or pesticide.

Adulterated: 1. Any pesticide whose strength or purity falls below the quality stated on its label. 2. A food, feed, or product that contains illegal pesticide residues.

Advanced Treatment: A level of wastewater treatment more stringent than secondary treatment; requires an 85-percent reduction in conventional pollutant concentration or a significant reduction in non-conventional pollutants.

Advanced Wastewater Treatment: Any treatment of sewage that goes beyond the secondary or biological water treatment stage and includes the removal of nutrients such as phosphorus and nitrogen and a high percentage of suspended solids. (See primary, secondary treatment.)

Advisory: A non-regulatory document that communicates risk information to those who may have to make risk management decisions.

Aerated Lagoon: A holding and/or treatment pond that speeds up the natural process of biological decomposition of organic waste by stimulating the growth and activity of bacteria that degrade organic waste.

Aeration: A process which promotes biological degradation of organic matter in water. The process may be passive (as when waste is exposed to air), or active (as when a mixing or bubbling device introduces the air).

Aeration Tank: A chamber used to inject air into water.

Aerobic Treatment: Process by which microbes decompose complex organic compounds in the presence of oxygen and use the liberated energy for reproduction and growth. (Such processes include extended aeration, trickling filtration, and rotating biological contactors.)

Aerobic: Life or processes that require, or are not destroyed by, the presence of oxygen. (See: anaerobic.)

Aerosol: A suspension of liquid or solid particles in a gas.

Affected Public: The people who live and/or work near a hazardous waste site.

Afterburner: In incinerator technology, a burner located so that the combustion gases are made to pass through its flame in order to remove smoke and odors. It may be attached to or be separated from the incinerator proper.

Agent Orange: A toxic herbicide and defoliant used in the Vietnam conflict, containing 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2,4-dichlorophenoxyacetic acid (2,4-D) with trace amounts of dioxin.

Agricultural Pollution: Farming wastes, including runoff and leaching of pesticides and fertilizers; erosion and dust from plowing; improper disposal of animal manure and carcasses; crop residues, and debris.

Agro-ecosystem: Land used for crops, pasture, and livestock; the adjacent uncultivated land that supports other vegetation and wildlife; and the associated atmosphere, the underlying soils, groundwater, and drainage networks.

AHERA Designated Person (ADP): A person designated by a Local Education Agency to ensure that the AHERA requirements for asbestos management and abatement are properly implemented.

Air Changes Per Hour (ACH): The movement of a volume of air in a given period of time; if a house has one air change per hour, it means that all of the air in the house will be replaced in a one-hour period.

Air Contaminant: Any particulate matter, gas, or combination thereof, other than water vapor. (See: air pollutant.)

Air Curtain: A method of containing oil spills. Air bubbling through a perforated pipe causes an upward water flow that slows the spread of oil. It can also be used to stop fish from entering polluted water.

Air Mass: A large volume of air with certain meteorological or polluted characteristics—e.g., a heat inversion or smogginess—while in one location. The characteristics can change as the air mass moves away.

Air Monitoring: (See: monitoring)

Air Plenum: Any space used to convey air in a building, furnace, or structure. The space above a suspended ceiling is often used as an air plenum.

Air Pollutant: Any substance in air that could, in high enough concentration, harm man, other animals, vegetation, or material. Pollutants may include almost any natural or artificial composition of airborne matter capable of being airborne. They may be in the form of solid particles, liquid droplets, gases, or in combination thereof. Generally, they fall into two main groups: (1) those emitted directly from identifiable sources and (2) those produced in the air by interaction between two or more primary pollutants, or by reaction with normal atmospheric constituents, with or without photoactivation. Exclusive of pollen, fog, and dust, which are of natural origin, about 100 contaminants have been identified and fall into the following categories: solids, sulfur compounds, volatile organic chemicals, nitrogen compounds, oxygen compounds, halogen compounds, radioactive compounds, and odors.

Air Pollution Episode: A period of abnormally high concentration of air pollutants, often due to low winds and temperature inversion, that can cause illness and death. (See: episode, pollution.)

Air Pollution Control Device: Mechanism or equipment that cleans emissions generated by an incinerator by removing pollutants that would otherwise be released to the atmosphere.

Air Pollution: The presence of contaminant or pollutant substances in the air that do not disperse properly and interfere with human health or welfare, or produce other harmful environmental effects.

Air Quality Criteria: The levels of pollution and lengths of exposure above which adverse health and welfare effects may occur.

Air Quality Control Region: An area designated by the federal government in which communities share a common air pollution problem, sometimes embracing several states.

Air Quality Standards: The level of pollutants prescribed by regulations that may not be exceeded during a given time in a defined area.

Air Stripping: A treatment system that removes volatile organic compounds (VOCs) from contaminated ground water or surface water by forcing an airstream through the water and causing the compounds to evaporate.

Air Toxics: Any air pollutant for which a national ambient air quality standard (NAAQS) does not exist (i.e., excluding ozone, carbon monoxide, PM-10, sulfur dioxide, nitrogen oxide) that may reasonably be anticipated to cause cancer, developmental effects, reproductive dysfunctions, neurological disorders, heritable gene mutations, or other serious or irreversible chronic or acute health effects in humans.

Airborne Particulates: Total suspended particulate matter found in the atmosphere as solid particles or liquid droplets. Chemical composition of particulates varies widely, depending on location and time of year. Airborne particulates include: windblown dust, emissions from industrial processes, smoke from the burning of wood and coal, and motor vehicle or non-road engine exhausts, exhaust of motor vehicles.

Airborne Release: Release of any chemical into the air.

Alachlor: A herbicide, marketed under the trade name Lasso, used mainly to control weeds in corn and soybean fields.

Alar: Trade name for daminozide, a pesticide that makes apples redder, firmer, and less likely to drop off trees before growers are ready to pick them. It is also used to a lesser extent on peanuts, tart cherries, concord grapes, and other fruits.

Aldicarb: An insecticide sold under the trade name Temik. It is made from ethyl isocyanate.

Algae: Simple rootless plants that grow in sunlit waters in proportion to the amount of available nutrients. They can affect water quality adversely by lowering the dissolved oxygen in the water. They are food for fish and small aquatic animals.

Algal Blooms: Sudden spurts of algal growth, which can affect water quality adversely and indicate potentially hazardous changes in local water chemistry.

Alternate Method: Any method of sampling and analyzing for an air pollutant that is not a reference or equivalent method but that has been demonstrated in specific cases to EPA's satisfaction to produce results adequate for compliance monitoring.

Alternative Remedial Contract Strategy Contractors: Government contractors who provide project management and technical services to support remedial response activities at National Priorities List sites.

Ambient Air Quality Standards: (See: Criteria Pollutants and National Ambient Air Quality Standards.)

Ambient Air: Any unconfined portion of the atmosphere: open air, surrounding air.

Anaerobic: A life or process that occurs in, or is not destroyed by, the absence of oxygen.

Anaerobic Decomposition: Reduction of the net energy level and change in chemical composition of organic matter caused by microorganisms in an oxygen-free environment.

Antarctic "Ozone Hole": Refers to the seasonal depletion of ozone in a large area over Antarctica.

Anti-Degradation Clause: Part of federal air quality and water quality requirements prohibiting deterioration where pollution levels are above the legal limit.

Applicable or Appropriate Requirements (ARARs): Any state or federal statute that pertains to protection of human life and the environment in addressing specific conditions or use of a particular cleanup technology at a Superfund site.

Aquifer: An underground geological formation, or group of formations, containing usable amounts of groundwater that can supply wells and springs.

Area of Review: In the UIC program, the area surrounding an injection well that is reviewed during the permitting process to determine if flow between aquifers will be induced by the injection operation.

Area Source: Any small source of non-natural air pollution that is released over a relatively small area but which cannot be classified as a point source. Such sources may include vehicles and other small engines, small businesses and household activities.

Aromatics: A type of hydrocarbon, such as benzene or toluene, added to gasoline in order to increase octane. Some aromatics are toxic.

Arsenicals: Pesticides containing arsenic.

Asbestos: A mineral fiber that can pollute air or water and cause cancer or asbestosis when inhaled. EPA has banned or severely restricted its use in manufacturing and construction.

Asbestos Abatement: Procedures to control fiber release from asbestos-containing materials in a building or to remove them entirely, including removal, encapsulation, repair, enclosure, encasement, and operations and maintenance programs.

Asbestos-Containing Waste Materials (ACWM): Mill tailings or any waste that contains commercial asbestos and is generated by a source covered by the Clean Air Act Asbestos NESHAPS.

Asbestosis: A disease associated with inhalation of asbestos fibers. The disease makes breathing progressively more difficult and can be fatal.

Asbestos Program Manager: A building owner or designated representative who supervises all aspects of the facility asbestos management and control program.

Ash: The mineral content of a product remaining after complete combustion.

Assessment: In the asbestos-in-schools program, the evaluation of the physical condition and potential for damage of all friable asbestos containing materials and thermal insulation systems.

Assimilation: The ability of a body of water to purify itself of pollutants.

Assimilative Capacity: The capacity of a natural body of water to receive wastewaters or toxic materials without deleterious effects and without damage to aquatic life or humans who consume the water.

Attainment Area: An area considered to have air quality as good as or better than the national ambient air quality standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others.

Attenuation: The process by which a compound is reduced in concentration over time, through absorption, adsorption, degradation, dilution, and/or transformation.

Attractant: A chemical or agent that lures insects or other pests by stimulating their sense of smell.

Attrition: Wearing or grinding down of a substance by friction. Dust from such processes contributes to air pollution.

Availability Session: Informal meeting at a public location where interested citizens can talk with EPA and state officials on a one-to-one basis.

B

Background Level: In air pollution control, the concentration of air pollutants in a definite area during a fixed period of time prior to the starting up or on the stoppage of a source of emission under control. In toxic substances monitoring, the average presence in the environment, originally referring to naturally occurring phenomena.

BACT-Best Available Control Technology: An emission limitation based on the maximum degree of emission reduction (considering energy, environmental, and economic impacts) achievable through application of production processes and available methods, systems, and techniques. BACT does not permit emissions in excess of those allowed under any applicable Clean Air Act provisions. Use of the BACT concept is allowable on a case by case basis for major new or modified emissions sources in attainment areas and applies to each regulated pollutant.

Bacteria: (Singular: bacterium) Microscopic living organisms that can aid in pollution control by metabolizing organic matter in sewage, oil spills or other pollutants. However, bacteria in soil, water or air can also cause human, animal and plant health problems.

Baffle Chamber: In incinerator design, a chamber designed to promote the settling of fly ash and coarse particulate matter by changing the direction and/or reducing the velocity of the gases produced by the combustion of the refuse or sludge.

Baghouse Filter: Large fabric bag, usually made of glass fibers, used to eliminate intermediate and large (greater than 20 microns in diameter) particles. This device operates like the bag of an electric vacuum cleaner, passing the air and smaller particles while entrapping the larger ones.

Baling: Compacting solid waste into blocks to reduce volume and simplify handling.

Ballistic Separator: A machine that sorts organic from inorganic matter for composting.

Band Application: The spreading of chemicals over, or next to, each row of plants in a field.

Banking: A system for recording qualified air emission reductions for later use in bubble, offset, or netting transactions. (See: emissions trading.)

Bar Screen: In wastewater treatment, a device used to remove large solids.

Barrier Coating(s): A layer of a material that obstructs or prevents passage of something through a surface that is to be protected, e.g. grout, caulk, or various sealing compounds; sometimes used with polyurethane membranes to prevent corrosion or oxidation of metal surfaces, chemical impacts on various materials, or, for example, to prevent radon infiltration through walls, cracks, or joints in a house.

Basal Application: In pesticides, the application of a chemical on plant stems or tree trunks just above the soil line.

Bed Load: Sediment particles resting on or near the channel bottom that are pushed or rolled along by the flow of water.

BEN: EPA's computer model for analyzing a violator's economic gain from not complying with the law.

Bench-scale Tests: Laboratory testing of potential cleanup technologies (See: treatability studies.)

Beryllium: An airborne metal hazardous to human health when inhaled. It is discharged by machine shops, ceramic and propellant plants, and foundries.

Best Available Control Measures (BACM): A term used to refer to the most effective measures (according to EPA guidance) for controlling small or dispersed particulates from sources such as roadway dust, soot and ash from woodstoves and open burning of rush, timber, grasslands, or trash.

Best Demonstrated Available Technology (BDAT): As identified by EPA, the most effective commercially available means of treating specific types of hazardous waste. The BDATs may change with advances in treatment technologies.

Best Management Practice (BMP): Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from non-point sources.

Bimetal: Beverage containers with steel bodies and aluminum tops; handled differently from pure aluminum in recycling.

Bioaccumulants: Substances that increase in concentration in living organisms as they take in contaminated air, water, or food because the substances are very slowly metabolized or excreted. (See: biological magnification.)

Bioassay: Study of living organisms to measure the effect of a substance, factor, or condition by comparing before-and-after exposure or other data.

Biochemical Oxygen Demand (BOD): A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water. The greater the BOD, the greater the degree of pollution.

Biodegradable: Capable of decomposing rapidly under natural conditions.

Biodiversity: Refers to the variety and variability among living organisms and the ecological complexes in which they occur. Diversity can be defined as the number of different items and their relative frequencies. For biological diversity, these items are organized at many levels, ranging from complete ecosystems to the biochemical structures that are the molecular basis of heredity. Thus, the term encompasses different ecosystem, species, and genes.

Biological Control: In pest control, the use of animals and organisms that eat or otherwise kill or out-compete pests.

Biological Magnification: Refers to the process whereby certain substances such as pesticides or heavy metals move up the food chain, work their way into rivers or lakes, and are eaten by aquatic organisms such as fish, which in turn are eaten by large birds, animals or humans. The substances become concentrated in tissues or internal organs as they move up the chain. (See: bioaccumulative.)

Biological Oxidation: Decomposition of complex organic materials by microorganisms. Occurs in self-purification of water bodies and in activated sludge wastewater treatment.

Biological Oxygen Demand (BOD): An indirect measure of the concentration of biologically degradable material present in organic wastes. It usually reflects the amount of oxygen consumed in five days by biological processes breaking down organic waste.

Biological Treatment: A treatment technology that uses bacteria to consume organic waste.

Biologicals: Vaccines, cultures and other preparations made from living organisms and their products, intended for use in diagnosing, immunizing, or treating humans or animals, or in related research.

Biomass: All of the living material in a given area; often refers to vegetation.

Biome: Entire community of living organisms in a single major ecological area. (See: biotic community.)

Biomonitoring: 1. The use of living organisms to test the suitability of effluents for discharge into receiving waters and to test the quality of such waters downstream from the discharge. 2. Analysis of blood, urine, tissues, etc., to measure chemical exposure in humans.

Bioremediation: Use of living organisms to clean up oil spills or remove other pollutants from soil, water, or wastewater; use of organisms such as non-harmful insects to remove agricultural pests or counteract diseases of trees, plants, and garden soil.

Biosphere: The portion of Earth and its atmosphere that can support life.

Biostabilizer: A machine that converts solid waste into compost by grinding and aeration.

Biota: The animal and plant life of a given region.

Biotechnology: Techniques that use living organisms or parts of organisms to produce a variety of products (from medicines to industrial enzymes) to improve plants or animals or to develop microorganisms to remove toxics from bodies of water, or act as pesticides.

Biotic Community: A naturally occurring assemblage of plants and animals that live in the same environment and are mutually sustaining and interdependent. (See: biome.)

Blackwater: Water that contains animal, human, or food waste.

Blood Products: Any product derived from human blood, including but not limited to blood plasma, platelets, red or white corpuscles, and derived licensed products such as interferon.

Bloom: A proliferation of algae and/or higher aquatic plants in a body of water; often related to pollution, especially when pollutants accelerate growth.

BOD5: The amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter.

Bog: A type of wetland that accumulates appreciable peat deposits. Bogs depend primarily on precipitation for their water source, and are usually acidic and rich in plant residue with a conspicuous mat of living green moss.

Boom: 1. A floating device used to contain oil on a body of water. 2. A piece of equipment used to apply pesticides from a tractor or truck. (See: sonic boom.)

Botanical Pesticide: A pesticide whose active ingredient is a plant-produced chemical such as nicotine or strychnine. Also called a plant-derived pesticide.

Bottle Bill: Proposed or enacted legislation which requires a returnable deposit on beer or soda containers and provides for retail store or other redemption. Such legislation is designed to discourage use of throwaway containers.

Bottom Ash: The non-airborne combustion residue from burning pulverized coal in a boiler; the material which falls to the bottom of the boiler and is removed mechanically; a concentration of the non-combustible materials, which may include toxics.

Bottom Land Hardwoods: Forested freshwater wetlands adjacent to rivers in the southeastern United States, especially valuable for wildlife breeding, nesting and habitat.

Brine Mud: Waste material, often associated with well-drilling or mining, composed of mineral salts or other inorganic compounds.

Building Cooling Load: The hourly amount of heat that must be removed from a building to maintain indoor comfort (measured in British Thermal Units BTUs).

Broadcast Application: The spreading of pesticides over an entire area.

Bubble Policy: (See: emissions trading.)

Bubble: A system under which existing emissions sources can propose alternate means to comply with a set of emissions limitations; under the bubble concept, sources can control more than required at one emission point where control costs are relatively low in return for a comparable relaxation of controls at a second emission point where costs are higher.

Buffer Strips: Strips of grass or other erosion-resisting vegetation between or below cultivated strips or fields.

Bulk Sample: A small portion (usually thumbnail size) of a suspect asbestos-containing building material collected by an asbestos inspector for laboratory analysis to determine asbestos content.

Bulky Waste: Large items of waste materials, such as appliances, furniture, large auto parts, trees, stumps.

Burial Ground (Graveyard): A disposal site for radioactive waste materials that uses earth or water as a shield.

By-product: Material, other than the principal product, generated as a consequence of an industrial process.

C

Cadmium (Cd): A heavy metal element that accumulates in the environment.

Cancellation: Refers to Section 6 (b) of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) which authorizes cancellation of a pesticide registration if unreasonable adverse effects to the environment and public health develop when a product is used according to widespread and commonly recognized practice, or if its labeling or other material required to be submitted does not comply with FIFRA provisions.

Cap: A layer of clay, or other impermeable material installed over the top of a closed landfill to prevent entry of rainwater and minimize leachate.

Capacity Assurance Plan: A statewide plan which supports a state's ability to manage the hazardous waste generated within its boundaries over a twenty year period.

Capture Efficiency: The fraction of organic vapors generated by a process that are directed to an abatement or recovery device.

Carbon Absorber: An add-on control device that uses activated carbon to absorb volatile organic compounds from a gas stream. (The VOCs are later recovered from the carbon.)

Carbon Adsorption: A treatment system that removes contaminants from ground water or surface water by forcing it through tanks containing activated carbon treated to attract the contaminants, contaminants.

Carbon Monoxide (CO): A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion.

Carboxyhemoglobin: Hemoglobin in which the iron is bound to carbon monoxide (CO) instead of oxygen.

Carcinogen: Any substance that can cause or aggravate cancer.

Carrier: The inert liquid or solid material added to an active ingredient in a pesticide.

Carrying Capacity: 1. In recreation management, the amount of use a recreation area can sustain without loss of quality. 2. In wildlife management, the maximum number of animals an area can support during a given period.

Cask: A thick-walled container (usually lead) used to transport radioactive material. Also called a coffin.

Catalytic Converter: An air pollution abatement device that removes pollutants from motor vehicle exhaust, either by oxidizing them into carbon dioxide and water or reducing them to nitrogen and oxygen.

Catalytic Incinerator: A control device that oxidizes volatile organic compounds (VOCs) by using a catalyst to promote the combustion process. Catalytic incinerators require lower temperatures than conventional thermal incinerators, thus saving fuel and other costs.

Categorical Exclusion: A class of actions which either individually or cumulatively would not have a significant effect on the human environment and therefore would not require preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act (NEPA).

Categorical Pretreatment Standard: A technology-based effluent limitation for an industrial facility discharging into a municipal sewer system. Analogous in stringency to Best Availability Technology (BAT) for direct dischargers.

Cathodic Protection: A technique to prevent corrosion of a metal surface by making it the cathode of an electrochemical cell.

Cells: 1. In solid waste disposal, holes where waste is dumped, compacted, and covered with layers of dirt on a daily basis. 2. The smallest structural part of living matter capable of functioning as an independent unit.

Cementitious: Densely packed and non-fibrous friable materials.

Central Collection Point: Location where a generator of regulated medical waste consolidates wastes originally generated at various locations in his facility. The wastes are gathered together for treatment on-site or for transportation elsewhere for treatment and/or disposal. This term could also apply to community hazardous waste collections, industrial and other waste management systems.

Centrifugal Collector: A mechanical system using centrifugal force to remove aerosols from a gas stream or to de-water sludge.

Channelization: Straightening and deepening streams so water will move faster, a marsh-drainage tactic that can interfere with waste assimilation capacity, disturb fish and wildlife habitats, and aggravate flooding.

Characteristic: Any one of the four categories used in defining hazardous waste: ignitability, corrosivity, reactivity, and toxicity.

Chemical Oxygen Demand (COD): A measure of the oxygen required to oxidize all compounds, both organic and inorganic, in water.

Chemical Treatment: Any one of a variety of technologies that use chemicals or a variety of chemical processes to treat waste.

Chemnet: Mutual aid network of chemical shippers and contractors that assigns a contracted emergency response company to provide technical support if a representative of the firm whose chemicals are involved in an incident is not readily available.

Chemosterilant: A chemical that controls pests by preventing reproduction.

Chemtrec: The industry-sponsored Chemical Transportation Emergency Center; provides information and/or emergency assistance to emergency responders.

Chilling Effect: The lowering of the Earth's temperature because of increased particles in the air blocking the sun's rays. (See: greenhouse effect.)

Chlorinated Hydrocarbons: These include a class of persistent, broad-spectrum insecticides that linger in the environment and accumulate in the food chain. Among them are DDT, aldrin, dieldrin, heptachlor, chlordane, lindane, endrin, mirex, hexachloride, and toxaphene. Other examples include TCE, used as an industrial solvent.

Chlorinated Solvent: An organic solvent containing chlorine atoms, e.g., methylene chloride and 1,1,1-trichloromethane, used in aerosol spray containers and in highway paint.

Chlorination: The application of chlorine to drinking water, sewage, or industrial waste to disinfect or to oxidize undesirable compounds.

Chlorinator: A device that adds chlorine, in gas or liquid form, to water or sewage to kill infectious bacteria.

Chlorine-Contact Chamber: That part of a water treatment plant where effluent is disinfected by chlorine.

Chlorofluorocarbons (CFCs): A family of inert, nontoxic, and easily liquified chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere they drift into the upper atmosphere where their chlorine components destroy ozone.

Chlorosis: Discoloration of normally green plant parts caused by disease, lack of nutrients, or various air pollutants.

Cholinesterase: An enzyme found in animals that regulates nerve impulses. Cholinesterase inhibition is associated with a variety of acute symptoms such as nausea, vomiting, blurred vision, stomach cramps, and rapid heart rate.

Chromium: (See: heavy metals.)

Chronic Effect: An adverse effect on a human or animal in which symptoms recur frequently or develop slowly over a long period of time.

Chronic Toxicity: The capacity of a substance to cause long-term poisonous human health effects. (See: acute toxicity.)

Clarification: Clearing action that occurs during wastewater treatment when solids settle out. This is often aided by centrifugal action and chemically induced coagulation in wastewater.

Clarifier: A tank in which solids settle to the bottom and are subsequently removed as sludge.

Clay Soil: Soil material containing more than 40 percent clay, less than 45 percent sand, and less than 40 percent silt.

Clean Coal Technology: Any technology not in widespread use prior to the Clean Air Act amendments of 1990. This Act will achieve significant reductions in pollutants associated with the burning of coal.

Clean Fuels: Blends or substitutes for gasoline fuels, including compressed natural gas, methanol, ethanol, liquified petroleum gas, and others.

Cleanup: Actions taken to deal with a release or threat of release of a hazardous substance that could affect humans and/or the environment. The term "cleanup" is sometimes used interchangeably with the terms remedial action, removal action, response action, or corrective action.

Clear Cut: Harvesting all the trees in one area at one time, a practice that can encourage fast rainfall or snowmelt runoff, erosion, sedimentation of streams and lakes, flooding, and destroys vital habitat.

Cloning: In biotechnology, obtaining a group of genetically identical cells from a single cell; making identical copies of a gene.

Closed-Loop Recycling: Reclaiming or reusing wastewater for non-potable purposes in an enclosed process.

Closure: The procedure a landfill operator must follow when a landfill reaches its legal capacity for solid waste: ceasing acceptance of solid waste and placing a cap on the landfill site.

Coagulation: Clumping of particles in wastewater to settle out impurities, often induced by chemicals such as lime, alum, and iron salts.

Coastal Zone: Lands and waters adjacent to the coast that exert an influence on the uses of the sea and its ecology, or whose uses and ecology are affected by the sea.

Coefficient of Haze (COH): A measurement of visibility interference in the atmosphere.

Coke Oven: An industrial process which converts coal into coke, one of the basic materials used in blast furnaces for the conversion of iron ore into iron.

Cold Temperature CO: A standard for automobile carbon monoxide (CO) emissions to be met at a low temperature (i.e. 20 degrees Fahrenheit). Conventional automobile catalytic converters are less efficient upon start-up at low temperatures.

Coliform Index: A rating of the purity of water based on a count of fecal bacteria.

Coliform Organism: Microorganisms found in the intestinal tract of humans and animals. Their presence in water indicates fecal pollution and potentially adverse contamination by pathogens.

Collector Sewers: Pipes used to collect and carry wastewater from individual sources to an interceptor sewer that will carry it to a treatment facility.

Combined Sewer Overflows: Discharge of a mixture of storm water and domestic waste when the flow capacity of a sewer system is exceeded during rainstorms.

Combined Sewers: A sewer system that carries both sewage and storm-water runoff. Normally, its entire flow goes to a waste treatment plant, but during a heavy storm, the volume of water may be so great as to cause overflows of untreated mixtures of storm water and sewage into receiving waters. Storm-water runoff may also carry toxic chemicals from industrial areas or streets into the sewer system.

Combustion: 1. Burning, or rapid oxidation, accompanied by release of energy in the form of heat and light. A basic cause of air pollution. 2. Refers to controlled burning of waste, in which heat chemically alters organic compounds, converting into stable inorganics such as carbon dioxide and water.

Combustion Chamber: The actual compartment where waste is burned in an incinerator.

Combustion Product: Substance produced during the burning or oxidation of a material.

Command Post: Facility located at a safe distance upwind from an accident site, where the on-scene coordinator, responders, and technical representatives make response decisions, deploy manpower and equipment, maintain liaison with news media, and handle communications.

Comment Period: Time provided for the public to review and comment on a proposed EPA action or rulemaking after publication in the Federal Register.

Commercial Waste Management Facility: A treatment, storage, disposal, or transfer facility which accepts waste from a variety of sources, as compared to a private facility which normally manages a limited waste stream generated by its own operations.

Commercial Waste: All solid waste emanating from business establishments such as stores, markets, office buildings, restaurants, shopping centers, and theaters.

Commingle Recyclables: Mixed recyclables that are collected together.

Comminuter: A machine that shreds or pulverizes solids to make waste treatment easier.

Comminution: Mechanical shredding or pulverizing of waste. Used in both solid waste management and wastewater treatment.

Community: In ecology, a group of interacting populations in time and space. Sometimes, a particular subgrouping may be specified, such as the fish community in a lake or the soil arthropod community in a forest.

Community Relations: The EPA effort to establish two-way communication with the public to create understanding of EPA programs and related actions, to assure public input into decision-making processes related to affected communities, and to make certain that the Agency is aware of and responsive to public concerns. Specific community relations activities are required in relation to Superfund remedial actions.

Community Water System: A public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

Compaction: Reduction of the bulk of solid waste by rolling and tamping.

Compliance Coating: A coating whose volatile organic compound content does not exceed that allowed by regulation.

Compliance Monitoring: Collection and evaluation of data, including self-monitoring reports, and verification to show whether pollutant concentrations and loads contained in permitted discharges are in compliance with the limits and conditions specified in the permit.

Compliance Schedule: A negotiated agreement between a pollution source and a government agency that specifies dates and procedures by which a source will reduce emissions and, thereby, comply with a regulation.

Composite Sample: A series of water samples taken over a given period of time and weighted by flow rate.

Compost: The relatively stable humus material that is produced from a composting process in which bacteria in soil mixed with garbage and degradable trash break down the mixture into organic fertilizer.

Composting: The controlled biological decomposition of organic material in the presence of air to form a humus-like material. Controlled methods of composting include mechanical mixing and aerating, ventilating the materials by dropping them through a vertical series of aerated chambers, or placing the compost in piles out in the open air and mixing it or turning it periodically.

Conditional Registration: Under special circumstances, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) permits registration of pesticide products that is "conditional" upon the submission of additional data. These special circumstances include a finding by the EPA Administrator that a new product or use of an existing pesticide will not significantly increase the risk of unreasonable adverse effects. A product containing a new (previously unregistered) active ingredient may be conditionally registered only if the Administrator finds that such conditional registration is in the public interest, that a reasonable time for conducting the additional studies has not elapsed, and the use of the pesticide for the period of conditional registration will not present an unreasonable risk.

Conditionally Exempt Generators (CE): Persons or enterprises which produce less than 220 pounds of hazardous waste per month. Exempt from most regulation, they are required merely to determine whether their waste is hazardous, notify appropriate state or local agencies, and ship it by permitted facility for proper disposal. (See: an authorized transporter to a small quantity generator.)

Cone of Depression: A depression in the water table that develops around a pumped well.

Confined Aquifer: An aquifer in which ground water is confined under pressure which is significantly greater than atmospheric pressure.

Consent Decree: A legal document, approved by a judge, that formalizes an agreement reached between EPA and potentially responsible parties (PRPs) through which PRPs will conduct all or part of a cleanup action at a Superfund site; cease or correct actions or processes that are polluting the environment; or otherwise comply with EPA initiated regulatory enforcement actions to resolve the contamination at the Superfund site involved. The consent decree describes the actions PRPs will take and may be subject to a public comment period.

Conservation: Preserving and renewing, when possible, human and natural resources. The use, protection, and improvement of natural resources according to principles that will assure their highest economic or social benefits.

Construction and Demolition Waste: Waste building materials, dredging materials, tree stumps, and rubble resulting from construction, remodeling, repair, and demolition of homes, commercial buildings and other structures and pavements. May contain lead, asbestos, or other hazardous substances.

Contact Pesticide: A chemical that kills pests when it touches them, instead of by ingestion. Also, soil that contains the minute skeletons of certain algae that scratch and dehydrate waxy-coated insects.

Contaminant: Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.

Contingency Plan: A document setting out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or other accident that releases toxic chemicals, hazardous waste, or radioactive materials that threaten human health or the environment. (See: National Oil and Hazardous Substances Contingency Plan.)

Continuous Discharge: A routine release to the environment that occurs without interruption, except for infrequent shutdowns for maintenance, process changes, etc.

Contour Plowing: Soil tilling method that follows the shape of the land to discourage erosion.

Contract Labs: Laboratories under contract to EPA, which analyze samples taken from waste, soil, air, and water or carry out research projects.

Control Technique Guidelines (CTG): A series of EPA documents designed to assist states in defining reasonable available control technology (RACT) for major sources of volatile organic compounds (VOC).

Controlled Reaction: A chemical reaction under temperature and pressure conditions maintained within safe limits to produce a desired product or process.

Conventional Pollutants: Statutorily listed pollutants understood well by scientists. These may be in the form of organic waste, sediment, acid, bacteria, viruses, nutrients, oil and grease, or heat.

Conventional Systems: Systems that have been traditionally used to collect municipal wastewater in gravity sewers and convey it to a central primary or secondary treatment plant prior to discharge to surface waters.

Conventional Tillage: Tillage operations considered standard for a specific location and crop and that tend to bury the crop residues; usually considered as a base for determining the cost effectiveness of control practices.

Cooling Electricity Use: Amount of electricity used to meet the building cooling load. (See: building cooling load.)

Cooling Tower: A structure that helps remove heat from water used as a coolant; e.g., in electric power generating plants.

Cooperative Agreement: An assistance agreement whereby EPA transfers money, property, services or anything of value to a state for the accomplishment of CERC-LA-authorized activities or tasks.

Core: The uranium-containing heart of a nuclear reactor, where energy is released.

Core Program Cooperative Agreement: An assistance agreement whereby EPA supports states or tribal governments with funds to help defray the cost of non-item-specific administrative and training activities.

Corrosion: The dissolution and wearing away of metal caused by a chemical reaction such as between water and the pipes, chemicals touching a metal surface, or contact between two metals.

Corrosive: A chemical agent that reacts with the surface of a material causing it to deteriorate or wear away.

Cost-Effective Alternative: An alternative control or corrective method identified after analysis as being the best available in terms of reliability, performance, and cost. Although costs are one important consideration, regulatory and compliance analysis does not require EPA to choose the least expensive alternative. For example, when selecting a method for cleaning up a site on the Superfund National Priorities List, the Agency balances costs with the long-term effectiveness of the methods proposed.

Cost Recovery: A legal process by which potentially responsible parties who contributed to contamination at a Superfund site can be required to reimburse the Trust Fund for money spent during any cleanup actions by the federal government.

Cover Material: Soil used to cover compacted solid waste in a sanitary landfill.

Cover: Vegetation or other material providing protection as ground cover.

Cradle-to-Grave or Manifest System: A procedure in which hazardous materials are identified and followed as they are produced, treated, transported, and disposed of by a series of permanent, linkable, descriptive documents (e.g., manifests). Commonly referred to as the cradle-to-grave system.

Criteria Pollutants: The 1970 amendments to the Clean Air Act required EPA to set National Ambient Air Quality Standards for certain pollutants known to be hazardous to human health. EPA has identified and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide. The term, "criteria pollutants" derives from the requirement that EPA must describe the characteristics and potential health and welfare effects of these pollutants. It is on the basis of these criteria that standards are set or revised.

Criteria: Descriptive factors taken into account by EPA in setting standards for various pollutants. These factors are used to determine limits on allowable concentration levels, and to limit the number of violations per year. When issued by EPA, the criteria provide guidance to the states on how to establish their standards.

Crop Consumptive Use: The amount of water transpired during plant growth plus what evaporated from the soil surface and foliage in the crop area.

Cubic Feet Per Minute (CFM): A measure of the volume of a substance flowing through air within a fixed period of time. With regard to indoor air, refers to the amount of air, in cubic feet, that is exchanged with indoor air in a minute's time, i.e., the air exchange rate.

Cullet: Crushed glass.

Cultural Eutrophication: Increasing rate at which water bodies "die" by pollution from human activities.

Cultures and Stocks: Infectious agents and associated biologicals including: cultures from medical and pathological laboratories; cultures and stocks of infectious agents from research and industrial laboratories; waste from the production of biologicals; discarded live and attenuated vaccines; and culture dishes and devices used to transfer, inoculate, and mix cultures. (See: regulated medical waste.)

Cumulative Working Level Months (CWLm): The sum of lifetime exposure to radon working levels expressed in total working level months.

Curbside Collection: Method of collecting recyclable materials at homes, community districts or businesses.

Cutie-Pie: An instrument used to measure radiation levels.

Cyclone Collector: A device that uses centrifugal force to pull large particles from polluted air.

D

Data Call-In: A part of the Office of Pesticide Programs (OPP) process of developing key required test data, especially on the long-term, chronic effects of existing pesticides, in advance of scheduled Registration Standard reviews. Data Call-In from manufacturers is an adjunct of the Registration Standards program intended to expedite re-registration.

DDT: The first chlorinated hydrocarbon insecticide chemical name: Dichloro-Diphenyl-Trichloroethane. It has a half-life of 15 years and can collect in fatty tissues of certain animals. EPA banned registration and interstate sale of DDT for virtually all but emergency uses in the United States in 1972 because of its persistence in the environment and accumulation in the food chain.

Decay Products: Degraded radioactive materials, often referred to as "daughters" or "progeny"; radon decay products of most concern from a public health standpoint are polonium-214 and polonium-218.

Dechlorination: Removal of chlorine from a substance by chemically replacing it with hydrogen or hydroxide ions in order to detoxify a substance.

Decomposition: The breakdown of matter by bacteria and fungi, changing the chemical makeup and physical appearance of materials.

Decontamination: Removal of harmful substances such as noxious chemicals, harmful bacteria or other organisms, or radioactive material from exposed individuals, rooms and furnishings in buildings, or the exterior environment.

Deep-Well Injection: Deposition of raw or treated, filtered hazardous waste by pumping it into deep wells, where it is contained in the pores of permeable subsurface rock.

Deflocculating Agent: A material added to a suspension to prevent settling.

Defoliant: An herbicide that removes leaves from trees and growing plants.

Delegated State: A state (or other governmental entity such as a tribal government) that has received authority to administer an environmental regulatory program in lieu of a federal counterpart. As used in connection with NPDES, UIC, and PWS programs, the term does not connote any transfer of federal authority to a state.

Delist: Use of the petition process to have a facility's toxic designation rescinded.

Demand-side Waste Management: Prices whereby consumers use purchasing decisions to communicate to product manufacturers that they prefer environmentally sound products packaged with the least amount of waste, made from recycled or recyclable materials, and containing no hazardous substances.

Denitrification: The anaerobic biological reduction of nitrate to nitrogen gas.

Depletion Curve: In hydraulics, a graphical representation of water depletion from storage-stream channels, surface soil, and groundwater. A depletion curve can be drawn for base flow, direct runoff, or total flow.

Depressurization: A condition that occurs when the air pressure inside a structure is lower than the air pressure outside. Depressurization can occur when household appliances such as fireplaces or furnaces, that consume or exhaust house air, are not supplied with enough makeup air. Radon may be drawn into a house more rapidly under depressurized conditions.

Dermal Toxicity: The ability of a pesticide or toxic chemical to poison people or animals by contact with the skin. (See: contact pesticide.)

DES: A synthetic estrogen, diethylstilbestrol is used as a growth stimulant in food animals. Residues in meat are thought to be carcinogenic.

Desalination: [Desalinization] (1) Removing salts from ocean or brackish water by using various technologies. (2) Removal of salts from soil by artificial means, usually leaching.

Desiccant: A chemical agent that absorbs moisture; some desiccants are capable of drying out plants or insects, causing death.

Design Capacity: The average daily flow that a treatment plant or other facility is designed to accommodate.

Designated Pollutant: An air pollutant which is neither a criteria nor hazardous pollutant, as described in the Clean Air Act, but for which new source performance standards exist. The Clean Air Act does require states to control these pollutants, which include acid mist, total reduced sulfur (TRS), and fluorides.

Designated Uses: Those water uses identified in state water quality standards that must be achieved and maintained as required under the Clean Water Act. Uses can include cold water fisheries, public water supply, irrigation, etc.

Designer Bugs: Popular term for microbes developed through biotechnology that can degrade specific toxic chemicals at their source in toxic waste dumps or in ground water.

Destination Facility: The facility to which regulated medical waste is shipped for treatment and destruction, incineration, and/or disposal.

Destroyed Medical Waste: Regulated medical waste that has been ruined, torn apart, or mutilated through thermal treatment, melting, shredding, grinding, tearing, or breaking, so that it is no longer generally recognized as medical waste, but has not yet been treated (excludes compacted regulated medical waste.)

Destruction and Removal Efficiency (DRE): A percentage that represents the number of molecules of a compound removed or destroyed in an incinerator relative to the number of molecules entered the system (e.g., a DRE of 99.99 percent means that 9,999 molecules are destroyed for every 10,000 that enter; 99.99 percent is known as "four nines." For some pollutants, the RCRA removal requirement may be as stringent as "six nines.")

Destruction Facility: A facility that destroys regulated medical waste by mashing or mutilating it.

Desulfurization: Removal of sulfur from fossil fuels to reduce pollution.

Detectable Leak Rate: The smallest leak (from a storage tank), expressed in terms of gallons or liters per hour, that a test can reliably discern with a certain probability of detection or false alarm.

Detection Criterion: A predetermined rule to ascertain whether a tank is leaking or not. Most volumetric tests use a threshold value as the detection criterion. (See: volumetric tank tests.)

Detergent: Synthetic washing agent that helps to remove dirt and oil. Some contain compounds which kill useful bacteria and encourage algae growth when they are in wastewater that reaches receiving waters.

Development Effects: Adverse effects such as altered growth, structural abnormality, functional deficiency, or death observed in a developing organism.

Diatomaceous Earth (Diatomite): A chalk-like material (fossilized diatoms) used to filter out solid waste in wastewater treatment plants, also used as an active ingredient in some powdered pesticides.

Diazinon: An insecticide. In 1986, EPA banned its use on open areas such as sod farms and golf courses because it posed a danger to migratory birds. The ban did not apply to agricultural, home lawn or commercial establishment uses.

Dibenzofurans: A group of highly toxic organic compounds.

Difolol: A pesticide used on citrus fruits.

Diffused Air: A type of aeration that forces oxygen into sewage by pumping air through perforated pipes inside a holding tank.

Digester: In wastewater treatment, a closed tank; in solid-waste conversion, a unit in which bacterial action is induced and accelerated in order to break down organic matter and establish the proper carbon to nitrogen ratio.

Digestion: The biochemical decomposition of organic matter, resulting in partial gasification, liquefaction, and mineralization of pollutants.

Dike: A low wall that can act as a barrier to prevent a spill from spreading.

Diluent: Any liquid or solid material used to dilute or carry an active ingredient.

Dilution Ratio: The relationship between the volume of water in a stream and the volume of incoming water. It affects the ability of the stream to assimilate waste.

Dinocap: A fungicide used primarily by apple growers to control summer diseases. EPA proposed restrictions on its use in 1986 when laboratory tests found it caused birth defects in rabbits.

Dinoseb: A herbicide that is also used as a fungicide and insecticide. It was banned by EPA in 1986 because it posed the risk of birth defects and sterility.

Dioxin: Any of a family of compounds known chemically as dibenzo-p-dioxins. Concern about them arises from their potential toxicity and contaminants in commercial products. Tests on laboratory animals indicate that it is one of the more toxic man-made compounds.

Direct Discharger: A municipal or industrial facility which introduces pollution through a defined conveyance or system such as outlet pipes; a point source.

Disinfectant: A chemical or physical process that kills pathogenic organisms in water. Chlorine is often used to disinfect sewage treatment effluent, water supplies, wells, and swimming pools.

Dispersant: A chemical agent used to break up concentrations of organic material such as spilled oil.

Disposables: Consumer products, other items, and packaging used once or a few times and discarded.

Disposal: Final placement or destruction of toxic, radioactive, or other wastes; surplus or banned pesticides or other chemicals; polluted soils; and drums containing hazardous materials from removal actions or accidental releases. Disposal may be accomplished through use of approved secure landfills, surface impoundments, land farming, deep-well injection, ocean dumping, or incineration.

Dissolved Oxygen (DO): The oxygen freely available in water, vital to fish and other aquatic life and for the prevention of odors. DO levels are considered a most important indicator of a water body's ability to support desirable aquatic life. Secondary and advanced waste treatment are generally designed to ensure adequate DO in waste-receiving waters.

Dissolved Solids: Disintegrated organic and inorganic material in water. Excessive amounts make water unfit to drink or use in industrial processes.

Distillation: The act of purifying liquids through boiling, so that the steam condenses to a pure liquid and the pollutants remain in a concentrated residue.

Diversion: A channel with a supporting ridge on the lower side constructed across a slope to divert water at a non-erosive velocity to sites where it can be used or disposed of through a stable outlet.

Diversion Rate: The percentage of waste materials diverted from traditional disposal such as landfilling or incineration to be recycled, composted, or re-used.

DNA Hybridization: Use of a segment of DNA, called a DNA probe, to identify its complementary DNA; used to detect specific genes.

Dose Response: How a biological organism's response to a toxic substance quantitatively shifts as its overall exposure to the substance changes (e.g., a small dose of carbon monoxide may cause drowsiness; a large dose can be fatal.)

DOT Reportable Quantity: The quantity of a substance specified in U.S. Department of Transportation regulation that triggers labelling, packaging and other requirements related to shipping such substances.

Draft Permit: A preliminary permit drafted and published by EPA; subject to public review and comment before final action on the application.

Dredging: Removal of mud from the bottom of water bodies. This can disturb the ecosystem and causes silting that kills aquatic life. Dredging of contaminated muds can expose biota to heavy metals and other toxics. Dredging activities may be subject to regulation under Section 404 of the Clean Water Act.

Drop-off: Recyclable materials collection method in which individuals bring them to a designated collection site.

Dump: A site used to dispose of solid waste without environmental controls.

Dustfall Jar: An open container used to collect large particles from the air for measurement and analysis.

Dystrophic Lakes: Acidic, shallow bodies of water that contain much humus and/or other organic matter; contain many plants but few fish.

E

Ecological Impact: The effect that a man-made or natural activity has on living organisms and their non-living (abiotic) environment.

Ecology: The relationship of living things to one another and their environment, or the study of such relationships.

Ecological Indicator: A characteristic of the environment that, when measured, quantifies magnitude of stress, habitat characteristics, degree of exposure to a stressor, or ecological response to exposure. The term is a collective term for response, exposure. The term is a collective term for response, exposure, habitat, and stressor indicators.

Ecological Risk Assessment: The application of a formal framework, analytical process, or model to estimate the effects of human actions(s) on a natural resource and to interpret the significance of those effects in light of the uncertainties identified in each component of the assessment process. Such analysis includes initial hazard identification, exposure and dose-response assessments, and risk characterization.

Economic Poisons: Chemicals used to control pests and to defoliate cash crops such as cotton.

Ecosphere: The "bio-bubble" that contains life on earth, in surface waters, and in the air. (See: biosphere.)

Ecosystem: The interacting system of a biological community and its non-living environmental surroundings.

Ecosystem Structure: Attributes related to instantaneous physical state of an ecosystem; examples include species population density, species richness or evenness, and standing crop biomass.

Ecosystem: A habitat created by the juxtaposition of distinctly different habitats; an edge habitat; or an ecological zone or boundary where two or more ecosystems meet.

Effluent: Wastewater-treated or untreated that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Effluent Guidelines: Technical EPA documents which set effluent limitations for given industries and pollutants.

Effluent Limitation: Restrictions established by a State or EPA on quantities, rates, and concentrations in wastewater discharges.

Effluent Standard: (See effluent limitation.)

Electrodialysis: A process that uses electrical current applied to permeable membranes to remove minerals from water. Often used to desalinate salty or brackish water.

Electrostatic Precipitator (ESP): A device that removes particles from a gas stream (smoke) after combustion occurs. The ESP imparts an electrical charge to the particles, causing them to adhere to metal plates inside the precipitator. Rapping on the plates causes the particles to fall into a hopper for disposal.

Eligible Costs: The construction costs for waste-water treatment works upon which EPA grants are based.

EMAP Data: Environmental monitoring data collected under the auspices of the Environmental Monitoring and Assessment Program. All EMAP data share the common attribute of being of known quality, having been collected in the context of explicit data quality objectives (DQOs) and a consistent quality assurance program.

Emergency (Chemical): A situation created by an accidental release or spill of hazardous chemicals that poses a threat to the safety of workers, residents, the environment, or property.

Emergency Episode: (See: air pollution episode.)

Emergency Response Values: Concentrations of chemicals, published by various groups, defining acceptable levels for short-term exposures in emergencies.

Emission: Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys; and from motor vehicle, locomotive, or aircraft exhausts.

Emission Factor: The relationship between the amount of pollution produced and the amount of raw material processed. For example, an emission factor for a blast furnace making iron would be the number of pounds of particulates per ton of raw materials.

Emission Inventory: A listing, by source, of the amount of air pollutants discharged into the atmosphere of a community; used to establish emission standards.

Emission Standard: The maximum amount of air polluting discharge legally allowed from a single source, mobile or stationary.

Emissions Trading: EPA policy that allows a plant complex with several facilities to decrease pollution from some facilities while increasing it from others, so long as total results are equal to or better than previous limits. Facilities where this is done are treated as if they exist in a bubble in which total emissions are averaged out. Complexes that reduce emissions substantially may "bank" their "credits" or sell them to other industries. **Encapsulation:** The treatment of asbestos-containing material with a liquid that covers the surface with a protective coating or embeds fibers in an adhesive matrix to prevent their release into the air.

Enclosure: Putting an airtight, impermeable, permanent barrier around asbestos-containing materials to prevent the release of asbestos fibers into the air.

Endangered Species: Animals, birds, fish, plants, or other living organisms threatened with extinction by man-made or natural changes in their environment. Requirements for declaring a species endangered are contained in the Endangered Species Act.

Endangerment Assessment: A study to determine the nature and extent of contamination at a site on the National Priorities List and the risks posed to public health or the environment. EPA or the state conduct the study when a legal action is to be taken to direct potentially responsible parties to clean up a site or pay for it. An endangerment assessment supplements a remedial investigation.

Energy Recovery: Obtaining energy from waste through a variety of processes (e.g., combustion.)

Enforceable Requirements: Conditions or limitations in permits issued under the Clean Water Act, Section 402 or 404 that, if violated, could result in the issuance of a compliance order or initiation of a civil or criminal action under federal or applicable state laws. If a permit has not been issued, the term includes any requirement which, in the Regional Administrator's judgement, would be included in the permit when issued. Where no permit applies, the term includes any requirement which the RA determines is necessary for the best practical waste treatment technology to meet applicable criteria.

Enforcement: EPA, state, or local legal actions to obtain compliance with environmental laws, rules, regulations, or agreements and/or obtain penalties or criminal sanctions for violations. Enforcement procedures may vary, depending on the requirements of different environmental laws and related implementing regulations. Under CERCLA, for example, EPA will seek to require potentially responsible parties to clean up a Superfund site, or pay for the cleanup, whereas under the Clean Air Act the agency may invoke sanctions against cities failing to meet ambient air quality standards that could prevent certain types of construction or federal funding. In other situations, if investigations by EPA and state agencies uncover willful violations, criminal trials and penalties are sought.

Enforcement Decision Document (EDD): A document that provides an explanation to the public of EPA's selection of the cleanup alternative at enforcement sites on the National Priorities List. Similar to a Record of Decision.

Enhanced Inspection and Maintenance (I&M): An improved automobile inspection and maintenance program—aimed at reducing automobile emissions—that contains, at a minimum, more vehicle types and model years, tighter inspection, and better management practices. It may also include annual computerized or centralized inspections, under-the-hood inspection for signs of tampering with pollution control equipment, and increased repair waiver cost.

Enrichment: The addition of nutrients (e.g., nitrogen, phosphorus, carbon compounds) from sewage effluent or agricultural runoff to surface water, greatly increases the growth potential for algae and other aquatic plants.

Environment: The sum of all external conditions affecting the life, development and survival of an organism.

Environmental Assessment: An environmental analysis prepared pursuant to the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental Audit: An independent assessment of the current status of a party's compliance with applicable environmental requirements or of a party's environmental compliance policies, practices, and controls.

Environmental Impact Statement: A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals significantly affecting the environment. A tool for decision making, it describes the positive and negative effects of the undertaking and cites alternative actions.

Environmental Indicator: A measurement, statistic or value that provides a proximate gauge or evidence of the effects of environmental management programs or of the state or condition of the environment.

Environmental Response Team: EPA experts located in Edison, N.J., and Cincinnati, OH, who can provide around-the-clock technical assistance to EPA regional offices and states during all types of hazardous waste site emergencies and spills of hazardous substances.

Epidemiology: Study of the distribution of disease, or other health-related states and events in human populations, as related to age, sex, occupation, ethnic, and economic status in order to identify and alleviate health problems and promote better health.

Epilimnion: Upper waters of a thermally stratified lake subject to wind action.

Episode (Pollution): An air pollution incident in a given area caused by a concentration of atmospheric pollutants under meteorological conditions that may result in a significant increase in illnesses or deaths. May also describe water pollution events or hazardous material spills.

Equilibrium: In relation to radiation, the state at which the radioactivity of consecutive elements within a radioactive series is neither increasing nor decreasing.

Equivalent Method: Any method of sampling and analyzing for air pollution which has been demonstrated to the EPA Administrator's satisfaction to be, under specific conditions, an acceptable alternative to normally used reference methods.

Erosion: The wearing away of land surface by wind or water, intensified by land-clearing practices related to farming, residential or industrial development, road building, or logging.

Estuary: Regions of interaction between rivers and near-shore ocean waters, where tidal action and river flow mix fresh and salt water. Such areas include bays, mouths of rivers, salt marshes, and lagoons. These brackish water ecosystems shelter and feed marine life, birds, and wildlife. (See: wetlands.)

Ethylene Dibromide (EDB): A chemical used as an agricultural fumigant and in certain industrial processes. Extremely toxic and found to be a carcinogen in laboratory animals, EDB has been banned for most agricultural uses in the United States.

Eutrophic Lakes: ~~Shallow, murky bodies~~ of water with concentrations of plant nutrients causing excessive production of algae. (See: dystrophic lakes.)

Eutrophication: The slow aging process during which a lake, estuary, or bay evolves into a bog or marsh and eventually disappears. During the later stages of eutrophication the water body is choked by abundant plant life due to higher levels of nutritive compounds such as nitrogen and phosphorus. Human activities can accelerate the process.

Evaporation Ponds: Areas where sewage sludge is dumped and dried.

Evapotranspiration: The loss of water from the soil both by evaporation and by transpiration from the plants growing in the soil.

Exceedance: Violation of the pollutant levels permitted by environmental protection standards.

Exclusion: In the asbestos program, one of several situations that permit a Local Education Agency (LEA) to delete one or more of the items required by the Asbestos Hazard Emergency Response Act (AHERA), e.g., records of previous asbestos sample collection and analysis may be used by the accredited inspector in lieu of AHERA bulk sampling.

Exclusionary Ordinance: Zoning that excludes classes of persons or businesses from a particular neighborhood or area.

Exempt Solvent: Specific organic compounds not subject to requirements of regulation because are deemed by EPA to be of negligible photochemical reactivity.

Exempted Aquifer: Underground bodies of water defined in the Underground Injection Control program as aquifers that are potential sources of drinking water though not being used as such, and thus exempted from regulations barring underground injection activities.

Exotic Species: A species that is not indigenous to a region.

Experimental Use Permit: Obtained by manufacturers for testing new pesticides or uses of thereof whenever they conduct experimental field studies to support registration on 10 acres or more on land or one acre or more of water.

Explosive Limits: The amounts of vapor in the air that form explosive mixtures; limits are expressed as lower and upper limits and give the range of vapor concentrations in air that will explode if an ignition source is present.

Exposure: The amount of radiation or pollutant present in a given environment that represents a potential health threat to living organisms.

Exposure Indicator: A characteristic of the environment measured to provide evidence of the occurrence or magnitude of a response indicator's exposure to a chemical or biological stress.

Extraction Procedure (E P Toxic): Determining toxicity by a procedure which simulates leaching; if a certain concentration of a toxic substance can be leached from a waste, that waste is considered hazardous, i.e., "E P Toxic."

Extremely Hazardous Substances: Any of 406 chemicals identified by EPA as toxic, and listed under SARA Title III. The list is subject to periodic revision.

F

Fabric Filter: A cloth device that catches dust particles from industrial emissions.

Facilities Plans: Plans and studies related to the construction of treatment works necessary to comply with the Clean Water Act or RCRA. A facilities plan investigates needs and provides information on the cost effectiveness of alternatives, a recommended plan, an environmental assessment of the recommendations, and descriptions of the treatment works, costs, and a completion schedule.

Facility Emergency Coordinator: Representative of a facility covered by environmental law (e.g. a chemical plant) who participates in the emergency reporting process with the Local Emergency Planning Committee (LEPC).

Feasibility Study: 1. Analysis of the practicability of a proposal; e.g., a description and analysis of potential cleanup alternatives for a site such as one on the National Priorities List. The feasibility study usually recommends selection of a cost-effective alternative. It usually starts as soon as the remedial investigation is underway; together, they are commonly referred to as the "RI/FS". 2. A small-scale investigation of a problem to ascertain whether a proposed research approach is likely to provide useful data.

Fecal Coliform Bacteria: Bacteria found in the intestinal tracts of mammals. Their presence in water or sludge is an indicator of pollution and possible contamination by pathogens.

Federal Implementation Plan: Under current law, a federally implemented plan to achieve attainment of air quality standards, used when a state is unable to develop an adequate plan.

Feedlot: A confined area for the controlled feeding of animals. Tends to concentrate large amounts of animal waste that cannot be absorbed by the soil and, hence, may be carried to nearby streams or lakes by rainfall runoff.

Fen: A type of wetland that accumulates peat deposits. Fens are less acidic than bogs, deriving most of their water from groundwater rich in calcium and magnesium. (See: wetlands.)

FIFRA Pesticide Ingredient: An ingredient of a pesticide that must be registered with EPA under the Federal Insecticide, fungicide, and Rodenticide Act. Products making pesticide claims must register under FIFRA and may be subject to labeling and use requirements.

Filling: Depositing dirt, mud or other materials into aquatic areas to create more dry land, usually for agricultural or commercial development purposes, often with ruinous ecological consequences.

Filter Strip: Strip or area of vegetation used for removing sediment, organic matter, and other pollutants from runoff and waste water.

Filtration: A treatment process, under the control of qualified operators, for removing solid (particulate) matter from water by means of porous media such as sand or a man-made filter; often used to remove particles that containing pathogens.

Financial Assurance for Closure: Documentation or proof that an owner or operator of a facility such as a landfill or other waste repository is capable of paying the projected costs of closing the facility and monitoring it afterwards as provided in RCRA regulations.

Finding of No Significant Impact: A document prepared by a federal agency showing why a proposed action would not have a significant impact on the environment and thus would not require preparation of an Environmental Impact Statement. An FNSI is based on the results of an environmental assessment.

First Draw: The water that comes out when a tap is first opened, likely to have the highest level of lead contamination from plumbing materials.

Flare: A control device that burns hazardous materials to prevent their release into the environment; may operate continuously or intermittently, usually on top a stack.

Floc: A clump of solids formed in sewage by biological or chemical action.

Flocculation: Process by which clumps of solids in water or sewage aggregate through biological or chemical action so they can be separated from water or sewage.

Floor Sweep: Capture of heavier-than-air gases that collect at floor level.

Flow Rate: The rate, expressed in gallons-or liters-per-hour, at which a fluid escapes from a hole or fissure in a tank. Such measurements are also made of liquid waste, effluent, and surface water movement.

Flowmeter: A gauge indicating the velocity of wastewater moving through a treatment plant or of any liquid moving through various industrial processes.

Flue Gas Desulfurization: A technology that employs a sorbent, usually lime or limestone, to remove sulfur dioxide from the gases produced by burning fossil fuels. Flue gas desulfurization is current state-of-the-art technology for major SO₂ emitters, like power plants.

Flue Gas: The air coming out of a chimney after combustion in the burner it is venting. It can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, particles and many chemical pollutants.

Fluidized Bed Incinerator: An incinerator that uses a bed of hot sand or other granular material to transfer heat directly to waste. Used mainly for destroying municipal sludge.

Flume: A natural or man-made channel that diverts water.

Fluorides: Gaseous, solid, or dissolved compounds containing fluorine that result from industrial processes. Excessive amounts in food can lead to fluorosis.

Fluorocarbons (FCs): Any of a number of organic compounds analogous to hydrocarbons in which one or more hydrogen atoms are replaced by fluorine. Once used in the United States as a propellant for domestic aerosols, they are now found mainly in coolants and some industrial processes. FCs containing chlorine are called chlorofluorocarbons (CFCs). They are believed to be modifying the ozone layer in the stratosphere, thereby allowing more harmful solar radiation to reach the Earth's surface.

Flush: 1. To open a cold-water tap to clear out all the water which may have been sitting for a long time in the pipes. In new homes, to flush a system means to send large volumes of water gushing through the unused pipes to remove loose particles of solder and flux. 2. To force large amounts of water through liquid to clean out piping or tubing, storage or process tanks.

Fly Ash: Non-combustible residual particles expelled by flue gas.

Fogging: Applying a pesticide by rapidly heating the liquid chemical so that it forms very fine droplets that resemble smoke or fog. Used to destroy mosquitoes, black flies, and similar pests.

Food Chain: A sequence of organisms, each of which uses the next, lower member of the sequence as a food source.

Formaldehyde: A colorless, pungent, and irritating gas, CH₂O, used chiefly as a disinfectant and preservative and in synthesizing other compounds like resins.

Formulation: The substances comprising all active and inert ingredients in a pesticide.

Fresh Water: Water that generally contains less than 1,000 milligrams-per-liter of dissolved solids.

Friable Asbestos: Any material containing more than one percent asbestos, and that can be crumbled or reduced to powder by hand pressure. (May include previously non-friable material which becomes broken or damaged by mechanical force.)

Friable: Capable of being crumbled, pulverized, or reduced to powder by hand pressure.

Fuel Economy Standard: The Corporate Average Fuel Economy Standard (CAFE) effective in 1978. It enhanced the national fuel conservation effort imposing a miles-per-gallon floor for motor vehicles.

Fugitive Emissions: Emissions not caught by a capture system.

Fume: Tiny particles trapped in vapor in a gas stream.

Fumigant: A pesticide vaporized to kill pests. Used in buildings and greenhouses.

Functional Equivalent: Term used to describe EPA's decision-making process and its relationship to the environmental review conducted under the National Environmental Policy Act (NEPA). A review is considered functionally equivalent when it addresses the substantive components of a NEPA review.

Fungi: (Singular: Fungus) Molds, mildews, yeasts, mushrooms, and puffballs, a group of organisms lacking in chlorophyll (i.e., are not photosynthetic) and which are usually non-mobile, filamentous, and multicellular. Some grow in soil, others attach themselves to decaying trees and other plants whence they obtain nutrients. Some are pathogens, others stabilize sewage and digest composted waste.

Fungicide: Pesticides which are used to control, deter, or destroy fungi.

Fungistat: A chemical that keeps fungi from growing.

Furrow Irrigation: Irrigation method in which water travels through the field by means of small channels between each row or groups of rows.

Future Liability: Refers to potentially responsible parties' obligations to pay for additional response activities beyond those specified in the Record of Decision or Consent Decree.

G

Game Fish: Species like trout, salmon, or bass, caught for sport. Many of them show more sensitivity to environmental change than "rough" fish.

Garbage: Animal and vegetable waste resulting from the handling, storage, sale, preparation, cooking, and serving of foods.

Gas Chromatograph/Mass Spectrometer: Highly sophisticated instrument that identifies the molecular composition and concentrations of various chemicals in water and soil samples.

Gasification: Conversion of solid material such as coal into a gas for use as a fuel.

Gasoline Volatility: The property of gasoline whereby it evaporates into a vapor. Gasoline vapor is a volatile organic compound.

General Permit: A permit applicable to a class or category of dischargers.

General Reporting Facility: A facility having one or more hazardous chemicals above the 10,000 pound threshold for planning quantities. Such facilities must file MSDS and emergency inventory information with the SERC and LEPC and local fire departments.

Generator: 1. A facility or mobile source that emits pollutants into the air or releases hazardous waste into water or soil. 2. Any person, by site, whose act or process produces regulated medical waste or whose act first causes such waste to become subject to regulation. In a case where more than one person (e.g., doctors with separate medical practices) is located in the same building, each business entity is a separate generator.

Genetic Engineering: A process of inserting new genetic information into existing cells in order to modify any organism for the purpose of changing one of its characteristics.

Geographic Information System (GIS): A computer system designed for storing, manipulating, analyzing, and displaying data in a geographic context.

Germicide: Any compound that kills disease-causing microorganisms.

Glovebag: A polyethylene or polyvinyl chloride bag-like enclosure affixed around an asbestos-containing source (most often thermal system insulation) permitting the material to be removed while minimizing release of airborne fibers in the surrounding atmosphere.

Grain Loading: The rate at which particles are emitted from a pollution source. Measurement is made by the number of grains per cubic foot of gas emitted.

Granular Activated Carbon Treatment: A filtering system often used in small water systems and individual homes to remove organics. GAC can be highly effective in removing elevated levels of radon from water.

Grassed Waterway: Natural or constructed watercourse or outlet that is shaped or graded and established in suitable vegetation for the disposal of runoff water without erosion.

Gray Water: Domestic wastewater composed of wash water from kitchen, bathroom, and laundry sinks, tubs, and washers.

Greenhouse Effect: The warming of the Earth's atmosphere attributed to a build-up of carbon dioxide or other gases; some scientists think that this build-up allows the sun's rays to heat the Earth, while infra-red radiation makes the atmosphere opaque to a counterbalancing loss of heat.

Grinder Pump: A mechanical device that shreds solids and raises sewage to a higher elevation through pressure sewers.

Ground Cover: Plants grown to keep soil from eroding.

Ground Water: The supply of fresh water found beneath the Earth's surface, usually in aquifers, which supply wells and springs. Because ground water is a major source of drinking water, there is growing concern over contamination from leaching agricultural or industrial pollutants or leaking underground storage tanks.

Ground-Water Discharge: Ground water entering near coastal waters which has been contaminated by landfill leachate, deep well injection of hazardous wastes, septic tanks, etc.

Gully Erosion: Severe erosion in which trenches are cut to a depth greater than 30 centimeters (a foot). Generally, ditches deep enough to cross with farm equipment are considered gullies.

H

Habitat: The place where a population (e.g., human, animal, plant, microorganism) lives and its surroundings, both living and non-living.

Habitat Indicator: A physical attribute of the environment measured to characterize conditions necessary to support an organism, population, or community in the absence of pollutants, e.g., salinity of estuarine waters or substrate type in streams or lakes.

Half-Life: 1. The time required for a pollutant to lose half its affect on the environment. For example, the biochemical half-life of DDT in the environment is 15 years of Radium. 1,580 years. 2. The time required for half of the atoms of a radioactive element to undergo self-transmutation or decay. 3. The time required for the elimination of one half a total dose from the body.

Halon: Bromine-containing compounds with long atmospheric lifetimes whose breakdown in the stratosphere causes depletion of ozone. Halons are used in fire-fighting.

Hammermill: A high-speed machine that uses hammers and cutters to crush, grind, chip, or shred solid waste.

Hard Water: Alkaline water containing dissolved salts that interfere with some industrial processes and prevent soap from sudsing.

Hauler: Garbage collection company that offers complete refuse removal service; many also will also collect recyclables.

Hazard Communication Standard: An OSHA regulation that requires chemical manufacturers, suppliers, and importers to assess the hazards of the chemicals that they make, supply, or import, and to inform employers, customers, and workers of these hazards through MSDS sheets.

Hazardous Air Pollutants: Air pollutants which are not covered by ambient air quality standards but which, as defined in the Clean Air Act, may reasonably be expected to cause or contribute to irreversible illness or death. Such pollutants include asbestos, beryllium, mercury, benzene, coke oven emissions, radionuclides, and vinyl chloride.

Hazardous Chemical: An EPA designation for any hazardous material requiring an MSDS under OSHA's Hazard Communication Standard. Such substances are capable of producing fires and explosions or adverse health effects like cancer and dermatitis. Hazardous chemicals are distinct from hazardous waste. (See: Hazardous Waste.)

Hazardous Ranking System: The principle screening tool used by EPA to evaluate risks to public health and the environment associated with abandoned or uncontrolled hazardous waste sites. The HRS calculates a score based on the potential of hazardous substances spreading from the site through the air, surface water, or ground water, and on other factors such as density and proximity of human population. This score is the primary factor in deciding if the site should be on the National Priorities List and, if so, what ranking it should have compared to other sites on the list.

Hazardous Substance: 1. Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive. 2. Any substance designated by EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or if otherwise released into the environment.

Hazardous Waste: By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Hazardous Waste Landfill: An excavated or engineered site where hazardous waste is deposited and covered.

Hazards Analysis: Procedures used to (1) identify potential sources of release of hazardous materials from fixed facilities or transportation accidents; (2) determine the vulnerability of a geographical area to a release of hazardous materials; and (3) compare hazards to determine which present greater or lesser risks to a community.

Hazards Identification: Providing information on which facilities have extremely hazardous substances, what those chemicals are, how much there is at each facility, how the chemicals are stored, and whether they are used at high temperatures.

Health Assessment: An evaluation of available data on existing or potential risks to human health posed by a Superfund site. The Agency for Toxic Substances and Disease Registry (ATSDR) of the Department of Health and Human Services (DHHS) is required to perform such an assessment at every site on the National Priorities List.

Heat Island Effect: A "dome" of elevated temperatures over an urban area caused by structural and pavement heat fluxes, and pollutant emissions.

Heavy Metals: Metallic elements with high atomic weights, e.g., mercury, chromium, cadmium, arsenic, and lead; can damage living things at low concentrations and tend to accumulate in the food chain.

Heptachlor: An insecticide that was banned on some food products in 1975 and all of them 1978. It was allowed for use in seed treatment until 1983. More recently it was found in milk and other dairy products in Arkansas and Missouri where dairy cattle were illegally fed treated seed.

Herbicide: A chemical pesticide designed to control or destroy plants, weeds, or grasses.

Herbivore: An animal that feeds on plants.

Heterotrophic Organisms: Species that are dependent on organic matter for food.

High-Density Polyethylene: A material used to make plastic bottles and other products that produces toxic fumes when burned.

High-Level Radioactive Waste (HLW): Waste generated in core fuel of a nuclear reactor, found at nuclear reactors or by nuclear fuel reprocessing; is a serious threat to anyone who comes near the waste without shielding. (See: low-level radioactive waste.)

High-Level Nuclear Waste Facility: Plant designed to handle disposal of used nuclear fuel, high-level radioactive waste, and plutonium waste.

Holding Pond: A pond or reservoir, usually made of earth, built to store polluted runoff.

Homeowner Water System: Any water system which supplies piped water to a single residence.

Homogeneous Area: In accordance with Asbestos Hazard and Emergency Response Act (AHERA) definitions, an area of surfacing materials, thermal surface insulation, or miscellaneous material that is uniform in color and texture.

Hood Capture Efficiency: Ratio of the emissions captured by a hood and directed into a control or disposal device, expressed as a percent of all emissions.

Host: 1. In genetics, the organism, typically a bacterium, into which a gene from another organism is transplanted. 2. In medicine, an animal infected or parasitized by another organism.

Household Waste (Domestic Waste): Solid waste, composed of garbage and rubbish, which normally originated in a private home or apartment house. Domestic waste may contain a significant amount of toxic or hazardous waste.

Hydraulic Gradient: In general, the direction of groundwater flow due to changes in the depth of the water table.

Hydrocarbons (HC): Chemical compounds that consist entirely of carbon and hydrogen.

Hydrogen Sulfide (HS): Gas emitted during organic decomposition. Also a by-product of oil refining and burning. Smells like rotten eggs and, in heavy concentration, can kill or cause illness.

Hydrogeology: The geology of ground water, with particular emphasis on the chemistry and movement of water.

Hydrology: The science dealing with the properties, distribution, and circulation of water.

Hypolimnion: Bottom waters of a thermally stratified lake. The hypolimnion of a eutrophic lake is usually low or lacking in oxygen.

Identification Code or EPA I.D. Number: The unique code assigned to each generator, transporter, and treatment, storage, or disposal facility by regulating agencies to facilitate identification and tracking of chemicals or hazardous waste.

Ignitable: Capable of burning or causing a fire.

Immediately Dangerous to Life and Health (IDLH): The maximum level to which a healthy individual can be exposed to a chemical for 30 minutes and escape without suffering irreversible health effects or impairing symptoms. Used as a "level of concern." (See: level of concern.)

Impoundment: A body of water or sludge confined by a dam, dike, floodgate, or other barrier.

Incident Command Post: A facility located at a safe distance from an emergency site, where the incident commander, key staff, and technical representatives can make decisions and deploy emergency manpower and equipment.

Incident Command System (ICS): The organizational arrangement wherein one person, normally the Fire Chief of the impacted district, is in charge of an integrated, comprehensive emergency response organization and the emergency incident site, backed by an Emergency Operations Center staff with resources, information, and advice.

Incineration: A treatment technology involving destruction of waste by controlled burning at high temperatures, e.g., burning sludge to remove the water and reduce the remaining residues to a safe, non-burnable ash that can be disposed of safely on land, in some waters, or in underground locations.

Incineration at Sea: Disposal of waste by burning at sea on specially-designed incinerator ships.

Incinerator: A furnace for burning waste under controlled conditions.

Incompatible Waste: A waste unsuitable for mixing with another waste or material because it may react to form a hazard.

Indicator: In biology, an organism, species, or community whose characteristics show the presence of specific environmental conditions, good or bad.

Indirect Discharge: Introduction of pollutants from a non-domestic source into a publicly owned waste-treatment system. Indirect dischargers can be commercial or industrial facilities whose wastes enter local sewers.

Indoor Air: The breathing air inside a habitable structure or conveyance.

Indoor Air Pollution: Chemical, physical, or biological contaminants in indoor air.

Indoor Climate: Temperature, humidity, lighting, and noise levels in a habitable structure or conveyance. Indoor climate can affect indoor air pollution.

Industrial Pollution Prevention: Combination of industrial source reduction and toxic chemical use substitution

Industrial Source Reduction: Practices that reduce the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment; Also reduces the threat to public health and the environment associated with such releases. Term includes equipment or technology modifications, substitution of raw materials, and improvements in housekeeping, maintenance, training or inventory control.

Industrial Waste: Unwanted materials from an industrial operation; may be liquid, sludge, solid, or hazardous waste.

Inert Ingredient: Pesticide components such as solvents, carriers, dispersants, and surfactants that are not active against target pests. Not all inert ingredients are innocuous.

Inertial Separator: A device that uses centrifugal force to separate waste particles.

Infectious Agent: Any organism, such as a virus or bacterium, that is pathogenic and capable of being communicated by invasion and multiplication in body tissues.

Infectious Waste: Hazardous waste with infectious characteristics, including: contaminated animal waste; human blood and blood products; isolation waste, pathological waste; and discarded sharps (needles, scalpels or broken medical instruments.)

Infiltration: 1. The penetration of water through the ground surface into sub-surface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls. 2. The technique of applying large volumes of waste water to land to penetrate the surface and percolate through the underlying soil. (See: percolation.)

Infiltration Rate: The quantity of water than can enter the soil in a specified time interval.

Inflow: Entry of extraneous rain water into a sewer system from sources other than infiltration, such as basement drains, manholes, storm drains, and street washing.

Influent: Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment plant.

Information File: In the Superfund program, a file that contains accurate, up-to-date documents on a Superfund site. The file is usually located in a public building (school, library, or city hall) convenient for local residents.

Injection Well: A well into which fluids are injected for purposes such as waste disposal, improving the recovery of crude oil, or solution mining.

Injection Zone: A geological formation receiving fluids through a well.

Innovative Technologies: New or inventive methods to treat effectively hazardous waste and reduce risks to human health and the environment.

Inoculum: 1. Bacterium placed in compost to start biological action. 2. A medium containing organisms that is introduced into cultures or living organisms.

Inorganic Chemicals: Chemical substances of mineral origin, not of basically carbon structure.

Insecticide: A pesticide compound specifically used to kill or prevent the growth of insects.

Inspection and Maintenance (I/M): 1. Activities to assure that vehicles' emissions-controls work properly. 2. Also applies to wastewater treatment plants and other anti-pollution facilities and processes.

Instream Use: Water use taking place within a stream channel, e.g., hydro-electric power generation, navigation, water quality improvement, fish propagation, recreation.

In-Situ Stripping: Treatment system that remove or "strips" volatile organic compounds from contaminated ground or surface water by forcing an airstream through the water and causing the compounds to evaporate.

Integrated Pest Management (IPM): A mixture of chemical and other, non-pesticide, methods to control pests.

Integrated Waste Management: Using a variety of practices to handle municipal solid waste; can include source reduction, recycling, incineration, and landfilling.

Interceptor Sewers: Large sewer lines that, in a combined system, control the flow of sewage to the treatment plant. In a storm, they allow some of the sewage to flow directly into a receiving stream, thus keeping it from overflowing onto the streets. Also used in separate systems to collect the flows from main and trunk sewers and carry them to treatment points.

Interim (Permit) Status: Period during which treatment, storage and disposal facilities coming under RCRA in 1980 are temporarily permitted to operate while awaiting a permanent permit. Permits issued under these circumstances are usually called "Part A" or "Part B" permits.

Interstate Carrier Water Supply: A source of water for drinking and sanitary use on planes, buses, trains, and ships operating in more than one state. These sources are federally regulated.

Interstate Commerce Clause: A clause of the U.S. Constitution which reserves to the federal government the right to regulate the conduct of business across state lines. Under this clause, for example, the U.S. Supreme Court has ruled that states may not inequitably restrict the disposal out-of-state wastes in their jurisdictions.

Interstate Waters: Waters that flow across or form part of state or international boundaries, e.g., the Great Lakes, the Mississippi River, or coastal waters.

Interstitial Monitoring: The continuous surveillance of the space between the walls of an underground storage tank.

Inventory (TSCA): Inventory of chemicals produced pursuant to Section 8 (b) of the Toxic Substances Control Act.

Inversion: A layer of warm air preventing the rise of cooling air and pollutants trapped beneath it. Can cause an air pollution episode.

Ion: An electrically charged atom that can be drawn from waste water during electro-dialysis.

Ion Exchange Treatment: A common water-softening method often found on a large scale at water purification plants that remove some organics and radium by adding calcium oxide or calcium hydroxide to increase the pH to a level where the metals will precipitate out.

Ionization Chamber: A device that measures the intensity of ionizing radiation.

Ionizing Radiation: Radiation that can strip electrons from atoms, i.e., alpha, beta, and gamma radiation.

Irradiated Food: Food subject to brief radioactivity, usually gamma rays, to kill insects, bacteria, and mold, and to permit storage without refrigeration.

Irradiation: Exposure to radiation of wavelengths shorter than those of visible light (gamma, x-ray, or ultraviolet), for medical purposes, to sterilize milk or other food-stuffs, or to induce polymerization of monomers or vulcanization of rubber.

Irrigation: Applying water or wastewater to land areas to supply the water and nutrient needs of plants.

Irrigation Efficiency: The amount of water stored in the crop root zone compared to the amount of irrigation water applied.

Irrigation Return Flow: Surface and sub-surface water which leaves the field following application of irrigation water.

Irritant: A substance that can cause irritation of the skin, eyes, or respiratory system. Effects may be acute from a single high level exposure, or chronic from repeated low-level exposures to such compounds as chlorine, nitrogen dioxide, and nitric acid.

Isotope: A variation of an element that has the same atomic number of protons but a different weight because of the number of neutrons. Various isotopes of the same element may have different radioactive behaviors, some are highly unstable.

K

Karst: A geologic formation of irregular limestone deposits with sinks, underground streams, and caverns.

Kinetic Rate Coefficient: A number that describes the rate at which a water constituent such as a biochemical oxygen demand or dissolved oxygen rises or falls.

L

Lagoon: 1. A shallow pond where sunlight, bacterial action, and oxygen work to purify wastewater; also used for storage of wastewater or spent nuclear fuel rods. 2. Shallow body of water, often separated from the sea by coral reefs or sandbars.

Land Application: Discharge of wastewater onto the ground for treatment or reuse. (See: irrigation.)

Land Ban: Phasing out of land disposal of most untreated hazardous wastes, as mandated by the 1984 RCRA amendments.

Land Farming (of waste): A disposal process in which hazardous waste deposited on or in the soil is degraded naturally by microbes.

Landfills: 1. Sanitary landfills are disposal sites for non-hazardous solid wastes spread in layers, compacted to the smallest practical volume, and covered by material applied at the end of each operating day. 2. Secure chemical landfills are disposal sites for hazardous waste, selected and designed to minimize the chance of release of hazardous substances into the environment.

Landscape: The traits, patterns, and structure of a specific geographic area, including its biological composition, its physical environment, and its anthropogenic or social patterns. An area where interacting ecosystems are grouped and repeated in similar form.

Landscape Characterization: Documentation of the traits and patterns of the essential elements of the landscape.

Landscape Ecology: The study of the distribution patterns of communities and ecosystems, the ecological processes that affect those patterns, and changes in pattern and process over time.

Landscape Indicator: A measurement of the landscape, calculated from mapped or remotely sensed data, used to describe spatial patterns of land use and land cover across a geographic area. Landscape indicators may be useful as measures of certain

kinds of environmental degradation such as forest fragmentation.

Large Quantity Generator: Person or facility generating more than 2200 pounds of hazardous waste per month. Such generators produce about 90 percent of the nation's hazardous waste, and are subject to all RCRA requirements.

Lateral Sewers: Pipes that run under city streets and receive the sewage from homes and businesses, as opposed to domestic feeders and main trunk lines.

LC50/Lethal Concentration: Median level concentration, a standard measure of toxicity. It tells how much of a substance is needed to kill half of a group of experimental organisms in a given time. (See: LD50.)

LD 50/Lethal Dose: The dose of a toxicant that will kill 50 percent of the test organisms within a designated period. The lower the LD 50, the more toxic the compound.

Leachate: Water that collects contaminants as it trickles through wastes, pesticides or fertilizers. Leaching may occur in farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, ground water, or soil.

Leachate Collection System: A system that gathers leachate and pumps it to the surface for treatment.

Leaching: The process by which soluble constituents are dissolved and filtered through the soil by a percolating fluid. (See: leachate.)

Lead (Pb): A heavy metal that is hazardous to health if breathed or swallowed. Its use in gasoline, paints, and plumbing compounds has been sharply restricted or eliminated by federal laws and regulations. (See: heavy metals.)

Level of Concern (LOC): The concentration in air of an extremely hazardous substance above which there may be serious immediate health effects to anyone exposed to it for short periods. **Lift:** In a sanitary landfill, a compacted layer of solid waste and the top layer of cover material.

Lifting Station: (See: pumping station.)

Limestone Scrubbing: Use of a limestone and water solution to remove gaseous stack-pipe sulfur before it reaches the atmosphere.

Limited Degradation: An environmental policy permitting some degradation of natural systems but terminating at a level well beneath an established health standard.

Limiting Factor: A condition whose absence or excessive concentration, is incompatible with the needs or tolerance of a species or population and which may have a negative influence on their ability to thrive survive.

Limnology: The study of the physical, chemical, hydrological, and biological aspects of fresh water bodies.

Liner: 1. A relatively impermeable barrier designed to keep leachate inside a landfill. Liner materials include plastic and dense clay. 2. An insert or sleeve for sewer pipes to prevent leakage or infiltration.

Lipid Solubility: The maximum concentration of a chemical that will dissolve in fatty substances. Lipid soluble substances are insoluble in water. They will very selectively disperse through the environment via uptake in living tissue.

Liquefaction: Changing a solid into a liquid.

Liquid Injection Incinerator: Commonly used system that uses high pressure to prepare liquid wastes for incineration breaking them up into tiny droplets to allow easier combustion.

List: Shorthand term for EPA list of violating facilities or firms debarred from obtaining government contracts because they violated certain sections of the Clean Air or Clean Water Acts. The list is maintained by The Office of Enforcement and Compliance Monitoring.

Listed Waste: Wastes listed as hazardous under RCRA but which have not been subjected to the Toxic Characteristics Listing Process because the dangers they present are considered self-evident.

Litter: The highly visible portion of solid waste carelessly discarded outside the regular garbage and trash collection and disposal system.

Local Education Agency (LEA): In the asbestos program, an educational agency at the local level that exists primarily to operate schools or to contract for educational services, including primary and secondary public and private schools. A single, unaffiliated school can be considered an LEA for AHERA purposes.

Local Emergency Planning Committee (LEPC): A committee appointed by the state emergency response commission, as required by SARA Title III, to formulate a comprehensive emergency plan for its jurisdiction.

Low NO^x Burners: One of several combustion technologies used to reduce emissions of Nitrogen Oxides (NO^x).

Low-Level Radioactive Waste (LLRW): Wastes less hazardous than most of those associated with nuclear reactor; generated by hospitals, research laboratories, and certain industries. The Department of Energy, Nuclear Regulatory Commission, and EPA share responsibilities for managing them. (See: high-level radioactive wastes.)

Lower Explosive Limit (LEL): The concentration of a compound in air below which the mixture will not catch on fire.

Lowest Achievable Emission Rate: Under the Clean Air Act, the rate of emissions that reflects (a) the most stringent emission limitation in the implementation plan of any state for such source unless the owner or operator demonstrates such limitations are not achievable; or (b) the most stringent emissions limitation achieved in practice, whichever is more stringent. A proposed new or modified source may not emit pollutants in excess of existing new source standards.

M

Magnetic Separation: Use of magnets to separate ferrous materials from mixed municipal waste stream.

Mandatory Recycling: Programs which by law require consumers to separate trash so that some or all recyclable materials are recovered for recycling rather than going to landfills.

Manual Separation: Hand sorting of recyclable or compostable materials in waste.

Major Modification: This term is used to define modifications of major stationary sources of emissions with respect to Prevention of Significant Deterioration and New Source Review under the Clean Air Act.

Major Stationary Sources: Term used to determine the applicability of Prevention of Significant Deterioration and new source regulations. In a nonattainment area, any stationary pollutant source with potential to emit more than 100 tons per year is considered a major stationary source. In PSD areas the cutoff level may be either 100 or 250 tons, depending upon the source.

Majors: Larger publicly owned treatment works (POTWs) with flows equal to at least one million gallons per day (mgd) or servicing population equivalent to 10,000 persons; certain other POTWs having significant water quality impacts. (See: minors.)

Management Plan: Under the Asbestos Hazard Emergency Response Act (AHERA), a document that each Local Education Agency is required to prepare, describing all activities planned and undertaken by a school to comply with AHERA regulations, including building inspections to identify asbestos-containing materials, response actions, and operations and maintenance programs to minimize the risk of exposure.

Manifest System: Tracking of hazardous waste from "cradle to grave" (generation through disposal) with accompanying documents known as manifests. (See: Cradle to Grave.)

Manual Separation: Hand separation of compostable or recyclable material from waste.

Manufacturers Formulation: A list of substances or component parts as described by the maker of a coating, pesticide, or other product containing chemicals or other substances.

Marine Sanitation Device: Any equipment or process installed on board a vessel to receive, retain, treat, or discharge sewage.

Marsh: A type of wetland that does not accumulate appreciable peat deposits and is dominated by herbaceous vegetation. Marshes may be either fresh or saltwater, tidal or non-tidal. (See: wetlands.)

Material Category: In the asbestos program, broad classification of materials into thermal surfacing insulation, surfacing material, and miscellaneous material.

Materials Recovery Facility: A facility that processes residentially collected mixed recyclables into new products available for market.

Material Type is classification of suspect material by its specific use or application, e.g., pipe insulation, fireproofing, and floor tile.

Material Safety Data Sheet (MSDS): A compilation of information required under the OSHA Communication Standard on the identity of hazardous chemicals, health, and physical hazards, exposure limits, and precautions. Section 311 of SARA requires facilities to submit MSDSs under certain circumstances.

Materials Recovery Facility (MRF): Facility that processes residentially collected mixed recyclables into new products.

Maximum Contaminant Level: The maximum permissible level of a contaminant in water delivered to any user of a public system. MCLs are enforceable standards.

Maximum Contaminant Level Goal (MCLG): Under the Safe Drinking Water Act, a non-enforceable concentration of a drinking water contaminant, set at the level at which no known or anticipated adverse effects on human health occur and which allows an adequate safety margin. The MCLG is usually the starting point for determining the regulated Maximum Contaminant Level. (See: Maximum Contaminant Level.)

Mechanical Aeration: Use of mechanical energy to inject air into water to cause a waste stream to absorb oxygen.

Mechanical Separation: Using mechanical means to separate waste into various components.

Mechanical Turbulence: Random irregularities of fluid motion in air caused by buildings or other non-thermal processes.

Media: Specific environments—air, water, soil—which are the subject of regulatory concern and activities.

Medical Surveillance: A periodic comprehensive review of a worker's health status; acceptable elements of such surveillance program are listed in the Occupational Safety and Health Administration standards for asbestos.

Medical Waste: Any solid waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals, excluding hazardous waste identified or listed under 40 CFR Part 261 or any household waste as defined in 40 CFR Sub-section 261.4 (b)(1).

Mercury: A heavy metal that can accumulate in the environment and is highly toxic if breathed or swallowed. (See: heavy metals.)

Metabolites: Any substances produced by biological processes, such as those from pesticides.

Methane: A colorless, nonpoisonous, flammable gas created by anaerobic decomposition of organic compounds.

Method 18: An EPA test method which uses gas chromatographic techniques to measure the concentration of volatile organic compounds in a gas stream.

Method 24: An EPA reference method to determine density, water content and total volatile content (water and VOC) of coatings.

Method 25: An EPA reference method to determine the VOC concentration in a gas stream.

Microclimate: The localized climate conditions within an urban area or neighborhood.

Microbial Pesticide: A microorganism that is used to control a pest, but of minimum toxicity to man.

Million-gallons Per Day (MGD): A measure of water flow.

Minimization: A comprehensive program to minimize or eliminate wastes, usually applied to wastes at their point of origin. (See: waste minimization.)

Minors: Publicly owned treatment works with flows less than 1 million gallons per day. (See: majors.)

Miscellaneous ACM: Interior asbestos-containing building material or structural components, members or fixtures, such as floor and ceiling tiles; does not include surfacing materials or thermal system insulation.

Miscellaneous materials: Interior building materials on structural components, such as floor or ceiling tiles.

Miscible Liquids: Two or more liquids that can be mixed and will remain mixed under normal conditions.

Missed Detection: The situation that occurs when a test indicates that a tank is "tight" when in fact it is leaking.

Mist: Liquid particles measuring 40 to 500 microns, are formed by condensation of vapor. By comparison, fog particles are smaller than 40 microns.

Mitigation: Measures taken to reduce adverse impacts on the environment.

Mixed Funding: Settlements in which potentially responsible parties and EPA share the cost of a response action.

Mixed Liquor: A mixture of activated sludge and water containing organic matter undergoing activated sludge treatment in an aeration tank.

Mobile Incinerator Systems: Hazardous waste incinerators that can be transported from one site to another.

Mobile Source: Any non-stationary source of air pollution such as cars, trucks, motorcycles, buses, airplanes, locomotives.

Model Plant: A hypothetical plant design used for developing economic, environmental, and energy impact analyses as support for regulations or regulatory guidelines; first step in exploring the economic impact of a potential NSPS.

Molten Salt Reactor: A thermal treatment unit that rapidly heats waste in a heat-conducting fluid bath of carbonate salt.

Monitoring Well: 1. A well used to obtain water quality samples or measure groundwater levels. 2. Well drilled at a hazardous waste management facility or Superfund site to collect ground-water samples for the purpose of physical, chemical, or biological analysis to determine the amounts, types, and distribution of contaminants in the ground water beneath the site.

Monitoring: Periodic or continuous surveillance or testing to determine the level of compliance with statutory requirements and/or pollutant levels in various media or in humans, plants, and animals.

Monoclonal Antibodies: (Also called MABs and MCAs) 1. Man-made clones of a molecule, produced in quantity for medical or research purposes. 2. Molecules of living organisms that selectively find and attach to other molecules to which their structure conforms exactly. This could also apply to equivalent activity by chemical molecules.

Moratorium: During the negotiation process, a period of 60 to 90 days during which EPA and potentially responsible parties may reach settlement but no site response activities can be conducted.

Morbidity: Rate of disease incidence.

Muck Soils: Earth made from decaying plant materials.

Mulch: A layer of material (wood chips, straw, leaves, etc.) placed around plants to hold moisture, prevent weed growth, and enrich or sterilize the soil.

Multiple Use: Use of land for more than one purpose; i.e., grazing of livestock, watershed and wildlife protection, recreation, and timber production. Also applies to use of bodies of water for recreational purposes, fishing, and water supply.

Multistage Remote Sensing: A strategy for landscape characterization that involves gathering and analyzing information at several geographic scales, ranging from generalized levels of detail at the national level through high levels of detail at the local scale.

Municipal Discharge: Discharge of effluent from waste water treatment plants which receive waste water from households, commercial establishments, and industries in the coastal drainage basin. Combined sewer/separate storm overflows are included in this category.

N

National Ambient Air Quality Standards (NAAQS): Standards established by EPA that apply for outside air throughout the country. (See: criteria pollutants, state implementation plans, emissions trading.)

National Emissions Standards For Hazardous Air Pollutants (NESHAPS): Emissions standards set by EPA for an air pollutant not covered by NAAQS that may cause an increase in fatalities or in serious, irreversible, or incapacitating illness. Primary standards are designed to protect human health, secondary standards to protect public welfare (e.g., building facades, visibility, crops, and domestic animals).

National Estuary Program: A program established under the Clean Water Act Amendments of 1987 to develop and implement conservation and management plans for protecting estuaries and restoring and maintaining their chemical, physical, and biological integrity, as well as controlling point and nonpoint pollution sources.

National Municipal Plan: A policy created in 1984 by EPA and the states in 1984 to bring all publicly owned treatment works (POTWs) into compliance with Clean Water Act requirements.

National Oil and Hazardous Substances Contingency Plan (NOHSCP/NCP): The federal regulation that guides determination of the sites to be corrected under both the Superfund program and the program to prevent or control spills into surface waters or elsewhere.

National Pollutant Discharge Elimination System (NPDES): A provision of the Clean Water Act which prohibits discharge of pollutants into waters of the United States unless a special permit is issued by EPA, a state, or, where delegated, a tribal government on an Indian reservation.

National Priorities List (NPL): EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. EPA is required to update the NPL at least once a year. A site must be on the NPL to receive money from the Trust Fund for remedial action.

National Response Team (NRT): Representatives of 13 federal agencies that, as a team, coordinate federal responses to nationally significant incidents of pollution—an oil spill, a major chemical release, or a Superfund response action—and provide advice and technical assistance to the responding agency(ies) before and during a response action.

National Response Center: The federal operations center that receives notifications of all releases of oil and hazardous substances into the environment; open 24 hours a day, is operated by the U.S. Coast Guard, which evaluates all reports and notifies the appropriate agency.

Navigable Waters: Traditionally, waters sufficiently deep and wide for navigation by all, or specified vessels; such waters in the United States come under federal jurisdiction and are protected by certain provisions of the Clean Water Act.

Necrosis: Death of plant or animal cells or tissues. In plants, necrosis can discolor stems or leaves or kill a plant entirely.

Negotiations: (Under Superfund) After potentially responsible parties are identified for a site, EPA coordinates with them to reach a settlement that will result in the PRP paying for or conducting the cleanup under EPA supervision. If negotiations fail, EPA can order the PRP to conduct the cleanup or EPA can pay for the cleanup using Superfund monies and then sue to recover the costs.

Nematocide: A chemical agent which is destructive to nematodes.

Neutralization: Decreasing the acidity or alkalinity of a substance by adding alkaline or acidic materials, respectively.

New Source Performance Standards (NSPS): Uniform national EPA air emission and water effluent standards which limit the amount of pollution allowed from new sources or from modified existing sources.

New Source: Any stationary source built or modified after publication of final or proposed regulations that prescribe a given standard of performance.

Nitrate: A compound containing nitrogen that can exist in the atmosphere or as a dissolved gas in water and which can have harmful effects on humans and animals. Nitrates in water can cause severe illness in infants and domestic animals.

Nitric Oxide (NO): A gas formed by combustion under high temperature and high pressure in an internal combustion engine; changes into nitrogen dioxide in the ambient air and contributes to photochemical smog.

Nitrification: The process whereby ammonia in wastewater is oxidized to nitrite and then to nitrate by bacterial or chemical reactions.

Nitrilotriacetic Acid (NTA): A compound now replacing phosphates in detergents:

Nitrite: 1. An intermediate in the process of nitrification. 2. Nitrous oxide salts used in food preservation

Nitrogen Dioxide (NO₂): The result of nitric oxide combining with oxygen in the atmosphere; major component of photochemical smog.

Nitrogen Oxide (NO_x): Product of combustion from transportation and stationary sources and a major contributor to the formation of ozone in the troposphere and to acid deposition.

Nitrogenous Wastes: Animal or vegetable residues that contain significant amounts of nitrogen.

Nitrophenols: Synthetic organopesticides containing carbon, hydrogen, nitrogen, and oxygen.

No Further Remedial Action Planned: Determination made by EPA following a preliminary assessment that a site does not pose a significant risk and so requires no further activity under CERCLA.

Noise: Product-level or product-volume changes occurring during a test that are not related to a leak but may be mistaken for one.

Non-Attainment Area: Area that does not meet one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.

Non-Binding Allocations of Responsibility (NBAR): Process for EPA to propose a way for potentially responsible parties to allocate costs among themselves.

Non-Community Water System: A public water system that is not a community water system, e.g., the water supply at a camp site or national park.

Non-Conventional Pollutant: Any pollutant not statutorily listed or which is poorly understood by the scientific community.

No Further Remedial Action Planned: Determination made by EPA following a preliminary assessment that a site does not pose a significant risk and so requires no further activity under CERCLA.

Non-Point Source: Diffuse pollution sources (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet). The pollutants are generally carried off the land by storm water. Common non-point sources are agriculture, forestry, urban, mining, construction, dams, channels, land disposal, saltwater intrusion, and city streets.

Non-Contact Cooling Water: Water used for cooling which does not come into direct contact with any raw material, product, byproduct, or waste.

Non-degradation: An environmental policy which disallows any lowering of naturally occurring quality regardless of established health standards.

Non-ionizing Electromagnetic Radiation: 1. Radiation that does not change the structure of atoms but does heat tissue and may cause harmful biological effects. 2. Microwaves, radio waves, and low-frequency electromagnetic fields from high-voltage transmission lines.

Nondischarging Treatment Plant: A treatment plant that does not discharge treated wastewater into any stream or river. Most are pond systems that dispose of the total flow they receive by means of evaporation or percolation to groundwater, or facilities that dispose of their effluent by recycling or reuse (e.g., spray irrigation or groundwater discharge).

Nonfriable Asbestos-containing Materials: Any material containing more than one percent asbestos (as determined by Polarized Light Microscopy) that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Non-Road Emissions: Pollutants emitted by combustion engines on farm and construction equipment, gasoline-powered lawn and garden equipment, and power boats and outboard motors.

Notice of Deficiency: An EPA request to a facility owner or operator requesting additional information before a preliminary decision on a permit application can be made.

Notice of Intent to Deny: Notification by EPA of its preliminary intent to deny a permit application.

No Till: Planting crops without prior seedbed preparation, into an existing cover crop, sod, or crop residues, and eliminating subsequent tillage operations.

Nuclear Reactors and Support Facilities: Uranium mills, commercial power reactors, fuel reprocessing plants, and uranium enrichment facilities.

Nuclear Winter: Prediction by some scientists that smoke and debris rising from massive fires of a nuclear war could block sunlight for weeks or months, cooling the earth's surface and producing climate changes that could, for example, negatively effect world agricultural and weather patterns.

Nutrient: Any substance assimilated by living things that promotes growth. The term is generally applied to nitrogen and phosphorus in wastewater, but is also applied to other essential and trace elements.

O

Ocean Discharge Waiver: A variance from Clean Water Act requirements for discharges into marine waters.

Off-Site Facility: A hazardous waste treatment, storage or disposal area that is located away from the generating site.

Oil Fingerprinting: A method that identifies sources of oil and allows spills to be traced to their source.

Oil Spill: An accidental or intentional discharge of oil which reaches bodies of water. Can be controlled by chemical dispersion, combustion, mechanical containment, and/or adsorption. Spills from tanks and pipelines can also occur away from water bodies, contaminating the soil, getting into sewer systems and threatening underground water sources.

Oligotrophic Lakes: Deep clear lakes with few nutrients, little organic matter and a high dissolved-oxygen level.

On-Scene Coordinator (OSC): The pre-designated EPA, Coast Guard, or Department of Defense official who coordinates and directs Superfund removal actions or Clean Water Act oil-or hazardous-spill response actions.

On-Site Facility: A hazardous waste treatment, storage or disposal area that is located on the generating site.

Onboard Controls: Devices placed on vehicles to capture gasoline vapor during refueling and route it to the engines when the vehicle is starting so that it can be efficiently burned.

Opacity: The amount of light obscured by particulate pollution in the air; clear window glass has zero opacity, a brick wall is 100 percent opaque. Opacity is an indicator of changes in performance of particulate control systems.

Open Burning: Uncontrolled fires in an open dump.

Open Dump: An uncovered site used for disposal of waste without environmental controls. (See: dump.)

Operable Unit: Term for each of a number of separate activities undertaken as part of a Superfund site cleanup. A typical operable unit would be removal of drums and tanks from the surface of a site.

Operating Conditions: Conditions specified in a RCRA permit that dictate how an incinerator must operate as it burns different waste types. A trial burn is used to identify operating conditions needed to meet specified performance standards.

Operation And Maintenance: 1. Activities conducted after a Superfund site action is completed to ensure that the action is effective. 2. Actions taken after construction to assure that facilities constructed to treat waste water will be properly operated and maintained to achieve normative efficiency levels and prescribed effluent limitations in an optimum manner. 3. Ongoing asbestos management plan in a school or other public building, including regular inspections, various methods of maintaining asbestos in place, and removal when necessary.

Oral Toxicity: Ability of a pesticide to cause injury when ingested.

Organic: 1. Referring to or derived from living organisms. 2. In chemistry, any compound containing carbon.

Organic Chemicals/Compounds: Animal or plant-produced substances containing mainly carbon, hydrogen, nitrogen, and oxygen.

Organic Matter: Carbonaceous waste contained in plant or animal matter and originating from domestic or industrial sources.

Organophosphates: Pesticides that contain phosphorus; short-lived, but some can be toxic when first applied.

Organotins: Chemical compounds used in anti-foulant paints to protect the hulls of boats and ships, buoys, and pilings from marine organisms such as barnacles.

Original AHERA Inspection/Original Inspection/Inspection: Examination of school buildings arranged by Local Education Agencies to identify asbestos-containing materials, evaluate their condition, take samples of materials suspected to contain asbestos; performed by EPA-accredited inspectors

Original Generation Point: Where regulated medical or other material first becomes waste.

Outfall: The place where effluent is discharged into receiving waters.

Overburden: Rock and soil cleared away before mining.

Overfire Air: Air forced into the top of an incinerator or boiler to fan the flames.

Overland Flow: A land application technique that cleanses waste water by allowing it to flow over a sloped surface. As the water flows over the surface, contaminants are absorbed and the water is collected at the bottom of the slope for reuse.

Oversized Regulated Medical Waste: Medical waste that is too large for plastic bags or standard containers.

Overtum: One complete cycle of top to bottom mixing of previously stratified water masses. This phenomenon may occur in spring or fall, or after storms, and results in uniformity of chemical and physical properties of water at all depths.

Oxidant: A substance containing oxygen that reacts chemically in air to produce a new substance; the primary ingredient of photochemical smog.

Oxidation: The addition of oxygen that breaks down organic waste or chemicals such as cyanides, phenols, and organic sulfur compounds in sewage by bacterial and chemical means.

Oxidation Pond: A man-made body of water in which waste is consumed by bacteria, used most frequently with other waste-treatment processes; a sewage lagoon.

Oxygenated Fuels: Gasoline which has been blended with alcohols or ethers that contain oxygen in order to reduce carbon monoxide and other emissions.

Oxygenated Solvent: An organic solvent containing oxygen as part of the molecular structure. Alcohols and ketones are oxygenated compounds often used as paint solvents.

Ozone (O₃): Found in two layers of the atmosphere, the stratosphere and the troposphere. In the stratosphere (the atmospheric layer 7 to 10 miles or more above the earth's surface) ozone is a natural form of oxygen that provides a protective layer shielding the earth from ultraviolet radiation. In the troposphere (the layer extending up 7 to 10 miles from the earth's surface), ozone is a chemical oxidant and major component of photochemical smog. It can seriously impair the respiratory system and is one of the most widespread of all the criteria pollutants for which the Clean Air Act required EPA to set standards. Ozone in the troposphere is produced through complex chemical reactions of nitrogen oxides, which are among the primary pollutants emitted by combustion sources; hydrocarbons, released into the atmosphere through the combustion, handling and processing of petroleum products; and sunlight.

Ozonator: A device that adds ozone to water.

Ozone Depletion: Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or-bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.

Ozone Hole: Thinning break in the stratospheric ozone layer. Designation of amount of such depletion as a "ozone hole" is made when detected amount of depletion exceeds fifty percent. Seasonal ozone holes have been observed over both the Antarctic region and the Arctic region and part of Canada and the extreme northeastern United States.

P

Packaging: The assembly of one or more containers and any other components necessary to assure minimum compliance with a program's storage and shipment packaging requirements. Also, the containers, etc., involved.

Packed Bed Scrubber: An air pollution control device in which emissions pass through alkaline water to neutralize hydrogen chloride gas.

Packed Tower: A pollution control device that forces dirty air through a tower packed with crushed rock or wood chips while liquid is sprayed over the packing material. The pollutants in the air stream either dissolve or chemically react with the liquid.

Pandemic: A Widespread throughout an area, nation or the world.

Parameter: A variable, measurable property whose value is a determinant of the characteristics of a system; e.g., temperature, pressure, and density are parameters of the atmosphere.

Paraquat: A standard herbicide used to kill various types of crops, including marijuana.

Part A Permit, Part B Permit: (See: Interim Permit Status.)

Particulate Loading: The mass of particulates per unit volume of air or water.

Participation Rate: Portion of population participating in a recycling program.

Particulates: Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions.

Partition Coefficient: Measure of the sorption phenomenon, whereby a pesticide is divided between the soil and water phase; also referred to as adsorption partition coefficient.

Parts Per Billion (ppb)/Parts Per Million (ppm): Units commonly used to express contamination ratios, as in establishing the maximum permissible amount of a contaminant in water, land, or air.

Pathogens: Microorganisms that can cause disease in other organisms or in humans, animals and plants (e.g., bacteria, viruses, or parasites) found in sewage, in runoff from farms or rural areas populated with domestic and wild animals, and in water used for swimming. Fish and shellfish contaminated by pathogens, or the contaminated water itself, can cause serious illness.

Peak Electricity Demand: The maximum electricity used to meet the cooling load of a building or buildings in a given area.

Peak Levels: Levels of airborne pollutant contaminants much higher than average or occurring for short periods of time in response to sudden releases.

Percolation: The movement of water downward and radially through sub-surface soil layers, usually continuing downward to ground water; can also involve upward movement of water.

Performance Data (for incinerators): Information collected, during a trial burn, on concentrations of designated organic compounds and pollutants found in incinerator emissions. Data analysis must show that the incinerator meets performance standards under operating conditions specified in the RCRA permit. (See: trial burn; performance standards.)

Performance Standards: (1) Regulatory requirements limiting the concentrations of designated organic compounds, particulate matter, and hydrogen chloride in emissions from incinerators. (2) Operating standards established by EPA for various permitted pollution control systems, asbestos inspections, and various program operations and maintenance requirements.

Permeability: The rate at which liquids pass through soil or other materials in a specified direction.

Permit: An authorization, license, or equivalent control document issued by EPA or an approved state agency to implement the requirements of an environmental regulation; e.g., a permit to operate a wastewater treatment plant or to operate a facility that may generate harmful emissions.

Persistence: Refers to the length of time a compound stays in the environment, once introduced. A compound may persist for less than a second or indefinitely.

Persistent Pesticides: Pesticides that do not break down chemically or break down very slowly and remain in the environment after a growing season.

Personal Air Samples: Air samples taken with a pump is directly attached to the worker with the collecting filter and cassette placed in the worker's breathing zone (required under OSHA asbestos standards and EPA worker protection rule).

Pest: An insect, rodent, nematode, fungus, weed or other form of terrestrial or aquatic plant or animal life that is injurious to

Pesticide Tolerance: The amount of pesticide residue allowed by law to remain in or on a harvested crop. EPA sets these levels well below the point where the compounds might be harmful to consumers.

Pesticide: Substances or mixture thereof intended for preventing, destroying, repelling, or mitigating any pest. Also, any substance or mixture intended for use as a plant regulator, defoliant, or desiccant.

Phenols: Organic compounds that are byproducts of petroleum refining, tanning, and textile, dye, and resin manufacturing. Low concentrations cause taste and odor problems in water; higher concentrations can kill aquatic life and humans.

Phosphates: Certain chemical compounds containing phosphorus.

Phosphogypsum Piles (stacks): Principal byproduct generated in production of phosphoric acid from phosphate rock. These piles may generate radioactive radon gas.

Phosphorous Plants: Facilities using electric furnaces to produce elemental phosphorous for commercial use, such as high grade phosphoric acid, phosphate-based detergent, and organic chemicals use.

Phosphorus: An essential chemical food element that can contribute to the eutrophication of lakes and other water bodies. Increased phosphorus levels result from discharge of phosphorus-containing materials into surface waters.

Photochemical Oxidants: Air pollutants formed by the action of sunlight on oxides of nitrogen and hydrocarbons.

Photochemical Smog: Air pollution caused by chemical reactions of various pollutants emitted from different sources.

Photosynthesis: The manufacture by plants of carbohydrates and oxygen from carbon dioxide mediated by chlorophyll in the presence of sunlight.

Physical and Chemical Treatment: Processes generally used in large-scale wastewater treatment facilities. Physical processes may include air-stripping or filtration. Chemical treatment includes coagulation, chlorination, or ozonation. The term can also refer to treatment of toxic materials in surface and ground waters, oil spills, and some methods of dealing with hazardous materials on or in the ground.

Phytoplankton: That portion of the plankton community comprised of tiny plants, e.g., algae, diatoms.

Phytotoxic: Harmful to plants.

Picocuries Per Liter pCi/L: A unit of measure for levels of radon gas.

Pilot Tests: Testing a cleanup technology under actual site conditions to identify potential problems prior to full-scale implementation.

Plankton: Tiny plants and animals that live in water.

Plasma-arc Reactor: An incinerator that operates at extremely high temperatures; treats highly toxic wastes that do not burn easily.

Plasmid: A circular piece of DNA that exists apart from the chromosome and replicates independently of it. Bacterial plasmids carry information that renders the bacteria resistant to antibiotics. Plasmids are often used in genetic engineering to carry desired genes into organisms.

Plastics: Non-metallic chemoreactive compounds molded into rigid or pliable construction materials, fabrics, etc.

Plate Tower Scrubber: An air pollution control device that neutralizes hydrogen chloride gas by bubbling alkaline water through holes in a series of metal plates.

Plugging: Act or process of stopping the flow of water, oil, or gas into or out of a formation through a borehole or well penetrating that formation.

Plume: 1. A visible or measurable discharge of a contaminant from a given point of origin. Can be visible or thermal in water, or visible in the air as, for example, a plume of smoke. 2 The area of radiation leaking from a damaged reactor. 3. Area downwind within which a release could be dangerous for those exposed to leaking fumes.

Plutonium: A radioactive metallic element chemically similar to uranium.

PM-10: A new standard for measuring the amount of solid or liquid matter suspended in the atmosphere, i.e. the amount of particulate matter over 10 micrometers in diameter; smaller PM-10 particles penetrate to the deeper portions of the lung, affecting sensitive population groups such as children and individuals with respiratory ailments.

Point Source: A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution, e.g., a pipe, ditch, ship, ore pit, factory smokestack.

Pollen: The fertilizing element of flowering plants; background air pollutant.

Pollutant: Generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

Pollution Prevention: The active process of identifying areas, processes, and activities which create excessive waste byproducts for the purpose of substitution, alteration, or elimination of the process to prevent waste generation.

Pollutant Standard Index (PSI): Measure of adverse health effects of air pollution levels in major cities.

Pollution: Generally, the presence of matter or energy whose nature, location, or quantity produces undesired environmental effects. Under the Clean Water Act, for example, the term is defined as the man-made or man-induced alteration of the physical, biological, chemical, and radiological integrity of water.

Polonium: A radioactive element that occurs in pitchblende and other uranium-containing ores.

Polyelectrolytes: Synthetic chemicals that help solids to clump during sewage treatment.

Polymer: Basic molecular ingredients in plastic.

Polyvinyl Chloride (PVC): A tough, environmentally indestructible plastic that releases hydrochloric acid when burned.

Population: A group of interbreeding organisms occupying a particular space; the number of humans or other living creatures in a designated area.

Post-Closure: The time period following the shutdown of a waste management or manufacturing facility; for monitoring purposes, often considered to be 30 years.

Post-Consumer Recycling: Reuse of materials generated from residential and consumer waste, e.g. converting wastepaper from offices into corrugated boxes or newsprint.

Potable Water: Water that is safe for drinking and cooking.

Potentially Responsible Party (PRP): Any individual or company-including owners, operators, transporters or generators-potentially responsible for, or contributing to a spill or other contamination at a Superfund site. Whenever possible, through administrative and legal actions, EPA requires PRPs to clean up hazardous sites they have contaminated.

Precipitate: A solid that separates from a solution.

Precipitation: Removal of hazardous solids from liquid waste to permit safe disposal; removal of particles from airborne emissions.

Precipitator: Pollution control device that collects particles from an air stream.

Precursor: In photochemistry, a compound antecedent to a volatile organic compound (VOC). Precursors react in sunlight to form ozone or other photochemical oxidants.

Preliminary Assessment: The process of collecting and reviewing available information about a known or suspected waste site or release.

Pressure Sewers: A system of pipes in which water, wastewater, or other liquid is pumped to a higher elevation.

Pretreatment: Processes used to reduce, eliminate, or alter the nature of wastewater pollutants from non-domestic sources before they are discharged into publicly owned treatment works (POTWs).

Prevalent Level Samples: Air samples taken under normal conditions (also known as ambient background samples).

Prevalent Levels: Levels of airborne contaminant occurring under normal conditions.

Prevention of Significant Deterioration (PSD): EPA program in which state and/or federal permits are required in order to restrict emissions from new or modified sources in places where air quality already meets or exceeds primary and secondary ambient air quality standards.

Primary Drinking Water Regulation: Applies to public water systems and specifies a contaminant level, which, in the judgment of the EPA Administrator, will not adversely affect human health.

Primary Waste Treatment: First steps in wastewater treatment; screens and sedimentation tanks are used to remove most materials that float or will settle. Primary treatment removes about 30 percent of carbonaceous biochemical oxygen demand from domestic sewage.

Principal Organic Hazardous Constituents (POHCs): Hazardous compounds monitored during an incinerator's trial burn, selected for high concentration in the waste feed and difficulty of combustion.

Probability of Detection: The likelihood, expressed as a percentage, that a test method will correctly identify a leaking tank.

Process Verification: Verifying that process raw materials, water usage, waste treatment processes, production rate and other facts relative to quantity and quality of pollutants contained in discharges are substantially described in the permit application and the issued permit.

Process Wastewater: Any water that comes into contact with any raw material, product, byproduct, or waste.

Process Weight: Total weight of all materials, including fuel, used in a manufacturing process; used to calculate the allowable particulate emission rate.

Product Level: The level of a product in a storage tank.

Products of Incomplete Combustion (PICs): Organic compounds formed by combustion. Usually generated in small amounts and sometimes toxic, PICs are heat-altered versions of the original material fed into the incinerator (e.g., charcoal is a P.C. from burning wood).

Propellant: Liquid in a self-pressurized pesticide product that expels the active ingredient from its container.

Proposed Plan: A plan for a site cleanup that is available to the public for comment.

Proteins: Complex nitrogenous organic compounds of high molecular weight made of amino acids; essential for growth and repair of animal tissue. Many, but not all, proteins are enzymes.

Protocol: A series of formal steps for conducting a test.

Protoplast: A membrane-bound cell from which the outer wall has been partially or completely removed. The term often is applied to plant cells.

Protozoa: One-celled animals that are larger and more complex than bacteria. May cause disease.

Public Comment Period: The time allowed for the public to express its views and concerns regarding an action by EPA (e.g., a *Federal Register* Notice of proposed rule-making, a public notice of a draft permit, or a Notice of Intent to Deny).

Public Hearing: A formal meeting wherein EPA officials hear the public's views and concerns about an EPA action or proposal. EPA is required to consider such comments when evaluating its actions. Public hearings must be held upon request during the public comment period.

Public Notice: 1. Notification by EPA informing the public of Agency actions such as the issuance of a draft permit or scheduling of a hearing. EPA is required to ensure proper public notice, including publication in newspapers and broadcast over radio stations. 2. In the safe drinking water program, water suppliers are required to publish and broadcast notices when pollution problems are discovered.

Public Water System: A system that provides piped water for human consumption to at least 15 service connections or regularly serves 25 individuals.

Publicly Owned Treatment Works: A waste-treatment works owned by a state, unit of local government, or Indian tribe, usually designed to treat domestic wastewaters.

Pumping Station: Pumping devices installed in sewer or water systems or other liquid-carrying pipelines to move the liquids to a higher level.

Putrescible: Able to rot quickly enough to cause odors and attract flies.

Pyrolysis: Decomposition of a chemical by extreme heat.

Q

Quality Assurance/Quality Control: A system of procedures, checks, audits, and corrective actions to ensure that all EPA research design and performance, environmental monitoring and sampling, other technical and reporting activities are of the highest achievable quality.

Quench Tank: A water-filled tank used to cool incinerator residues or hot materials during industrial processes.

R

Radiation Standards: Regulations that set maximum exposure limits for protection of the public from radioactive materials.

Radio Frequency Radiation: (See Non-ionizing Radiation.)

Radioactive Substances: Substances that emit ionizing radiation.

Radioisotopes: Chemical variants of an element with potentially oncogenic, teratogenic, and mutagenic effects on the human body.

Radionuclide: Radioactive particle, man-made or natural, with a distinct atomic weight number. Can have a long life as soil or water pollutants.

Radius of Vulnerability Zone: The maximum distance from the point of release of a hazardous substance in which the airborne concentration could reach the level of concern under specified weather conditions.

Radon Decay Products: A term used to refer collectively to the immediate products of the radon decay chain. These include Po-218, Pb-214, Bi-214, and Po-214, which have an average combined half-life of about 30 minutes.

Radon: A colorless naturally occurring, radioactive, inert gas formed by radioactive decay of radium atoms in soil or rocks.

Rasp: A machine that grinds waste into a manageable material and helps prevent odor.

Raw Sewage: Untreated wastewater and its contents.

Raw Water: Intake water prior to any treatment or use.

Reasonably Available Control Measures (RACM): A broadly defined term referring to technological and other measures for pollution control.

Reasonably Available Control Technology (RACT): Control technology that is both reasonably available, and both technologically and economically feasible. Usually applied to existing sources in nonattainment areas; in most cases is less stringent than new source performance standards.

Receiving Waters: A river, lake, ocean, stream or other watercourse into which wastewater or treated effluent is discharged.

Recharge: The process by which water is added to a zone of saturation, usually by percolation from the soil surface, e.g., the recharge of an aquifer.

Recharge Area: A land area in which water reaches the zone of saturation from surface infiltration, e.g., where rainwater soaks through the earth to reach an aquifer.

Recombinant Bacteria: A microorganism whose genetic makeup has been altered by deliberate introduction of new genetic elements. The offspring of these altered bacteria also contain these new genetic elements, i.e. they "breed true."

Recombinant DNA: The new DNA that is formed by combining pieces of DNA from different organisms or cells.

Recommended Maximum Contaminant Level (RMCL): The maximum level of a contaminant in drinking water at which no known or anticipated adverse affect on human health would occur, and that includes an adequate margin of safety. Recommended levels are nonenforceable health goals. (See: maximum contaminant level.)

Reconstructed Source: Facility in which components are replaced to such an extent that the fixed capital cost of the new components exceed 50 percent of the capital cost of constructing a comparable brand-new facility. New-source performance standards may be applied to sources reconstructed after the proposal of the standard if it is technologically and economically feasible to meet the standard.

Record of Decision (ROD): A public document that explains which cleanup alternative(s) will be used at National Priorities List sites where, under CERCLA, Trust Funds pay for the cleanup.

Recovery Rate: Percentage of usable recycled materials that have been removed from the total amount of municipal solid waste generated in a specific area or by a specific business.

Reclamation: (In recycling) Restoration of materials found in the waste stream to a beneficial use which may be for purposes other than the original use.

Recycle/Reuse: Minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste (i.e. recycling of aluminum cans, paper, and bottles, etc.).

Red Bag Waste: (See: infectious waste.)

Red Border: An EPA document undergoing review before being submitted for final management decision-making.

Red Tide: A proliferation of a marine plankton toxic and often fatal to fish; perhaps stimulated by the addition of nutrients. A tide can be red, green, or brown, depending on the coloration of the plankton.

Reentry Interval: The period of time immediately following the application of a pesticide during which unprotected workers should not enter a field.

Reference Dose (RfD): The concentration of a chemical known to cause health problems; also be referred to as the ADI, or acceptable daily intake.

Reformulated Gasoline: Gasoline with a different composition from conventional gasoline (e.g., lower aromatics content) that cuts air pollutants.

Refuse Reclamation: Conversion of solid waste into useful products, e.g., composting organic wastes to make soil conditioners or separating aluminum and other metals for recycling.

Refuse: (See: solid waste.)

Regeneration: Manipulation of cells to cause them to develop into whole plants.

Regional Response Team (RRT): Representatives of federal, local, and state agencies who may assist in coordination of activities at the request of the On-Scene Coordinator before and during a significant pollution incident such as an oil spill, major chemical release, or a Superfund response.

Registrant: Any manufacturer or formulator who obtains registration for a pesticide active ingredient or product.

Registration: Formal listing with EPA of a new pesticide before it can be sold or distributed. Under the Federal Insecticide, Fungicide, and Rodenticide Act. EPA is responsible for registration (pre-market licensing) of pesticides on the basis of data demonstrating no unreasonable adverse effects on human health or the environment when applied according to approved label directions.

Registration Standards: Published documents which include summary reviews of the data available on a pesticide's active ingredient, data gaps, and the Agency's existing regulatory position on the pesticide.

Regulated Asbestos-Containing Material (RACM): Friable asbestos material or nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or has crumbled, or been pulverized or reduced to powder in the course of demolition or renovation operations.

Regulated Medical Waste: Under the Medical Waste Tracking Act of 1988, any solid waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals. Included are cultures and stocks of infectious agents; human blood and blood products; human pathological body wastes from surgery and autopsy; contaminated animal carcasses from medical research; waste from patients with communicable diseases; and all used sharp implements, such as needles and scalpels, etc., and certain unused sharps. (See: treated medical waste; untreated medical waste; destroyed medical waste.)

Release: Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of a hazardous or toxic chemical or extremely hazardous substance.

Remedial Action (RA): The actual construction or implementation phase of a Superfund site cleanup that follows remedial design.

Remedial Design: A phase of remedial action that follows the remedial investigation/feasibility study and includes development of engineering drawings and specifications for a site cleanup.

Remedial Investigation: An in-depth study designed to gather data needed to determine the nature and extent of contamination at a Superfund site; establish site cleanup criteria; identify preliminary alternatives for remedial action; and support technical and cost analyses of alternatives. The remedial investigation is usually done with the feasibility study. Together they are usually referred to as the "RI/FS".

Remedial Project Manager (RPM): The EPA or state official responsible for overseeing on-site remedial action.

Remedial Response: Long-term action that stops or substantially reduces a release or threat of a release of hazardous substances that is serious but not an immediate threat to public health.

Remediation: 1. Cleanup or other methods used to remove or contain a toxic spill or hazardous materials from a Superfund site; 2. for the Asbestos Hazard Emergency Response program, abatement methods including evaluation, repair, enclosure, encapsulation, or removal of greater than 3 linear feet or square feet of asbestos-containing materials from a building.

Remote Sensing: The collection and interpretation of information about an object without physical contact with the object; e.g., satellite imaging and aerial photograph.

Removal Action: Short-term immediate actions taken to address releases of hazardous substances that require expedited response. (See: cleanup.)

Reportable Quantity (RQ): Quantity of a hazardous substance that triggers reports under CERCLA. If a substance exceeds its RQ, the release must be reported to the National Response Center, the SERC, and community emergency coordinators for areas likely to be affected.

Repowering: Replacement of an existing coal-fired boiler with one or more clean coal technologies in order to achieve significantly greater emission reduction relative to the performance of technology in widespread use at the time the Clean Air Act amendments of 1990 were enacted. (See: Clean coal technology.)

Reregistration: The reevaluation and relicensing of existing pesticides originally registered prior to current scientific and regulatory standards. EPA reregisters pesticides through its Registration Standards Program.

Reserve Capacity: Extra treatment capacity built into solid waste and wastewater treatment plants and interceptor sewers to accommodate flow increases due to future population growth.

Reservoir: Any natural or artificial holding area used to store, regulate, or control water.

Residual: Amount of a pollutant remaining in the environment after a natural or technological process has taken place, e.g., the sludge remaining after initial wastewater treatment, or particulates remaining in air after it passes through a scrubbing or other process.

Residual Risk: The extent of health risk from air pollutants remaining after application of the Maximum Achievable Control Technology (MACT).

Resistance: For plants and animals, the ability to withstand poor environmental conditions or attacks by chemicals or disease. May be inborn or acquired.

Resource Recovery: The process of obtaining matter or energy from materials formerly discarded.

Response Action: 1. Generic term for actions taken in response to actual or potential health-threatening environmental events such as spills, sudden releases, and asbestos abatement/management problems; 2. A CERCLA-authorized action involving either a short-term removal action or a long-term removal response. This may include but is not limited to: removing hazardous materials from a site to an EPA-approved hazardous waste facility for treatment, containment or treating the waste on-site, identifying and removing the sources of ground-water contamination and halting further migration of contaminants; 3. Any of the following actions taken in school buildings in response to AHERA to reduce the risk of exposure to asbestos: removal, encapsulation, enclosure, repair, and operations and maintenance. (See: cleanup.)

Responsiveness Summary: A summary of oral and/or written public comments received by EPA during a comment period on key EPA documents, and EPA's response to those comments.

Restoration: Measures taken to return a site to pre-violation conditions.

Restricted Use: A pesticide may be classified (under FIFRA regulations) for restricted use if the it requires special handling because of its toxicity, and, if so, it may be applied only by trained, certified applicators or those under their direct supervision.

Restriction Enzymes: Enzymes that recognize specific regions of a long DNA molecule and cut it at those points.

Reuse: Using a product or component of municipal solid waste in its original form more than once, e.g., refilling a glass bottle that has been returned or using a coffee can to hold nuts and bolts.

Reverse Osmosis: A treatment process used in water systems by adding pressure to force water through a semi-permeable membrane. Reverse osmosis removes most drinking water contaminants. Also used in wastewater treatment. Large-scale reverse osmosis plants are being developed.

Ribonucleic Acid (RNA): A molecule that carries the genetic message from DNA to a cellular protein-producing mechanism.

Ringlemann Chart: A series of shaded illustrations used to measure the opacity of air pollution emissions, ranging from light grey through black; used to set and enforce emissions standards.

Riparian Habitat: Areas adjacent to rivers and streams with a high density, diversity, and productivity of plant and animal species relative to nearby uplands.

Riparian Rights: Entitlement of a land owner to certain uses of water on or bordering his property, including the right to prevent diversion or misuse of upstream waters. Generally a matter of state law.

Risk: A measure of the probability that damage to life, health, property, and/or the environment will occur as a result of a given hazard.

Risk Assessment: Qualitative and quantitative evaluation of the risk posed to human health and/or the environment by the actual or potential presence and/or use of specific pollutants.

Risk Communication: The exchange of information about health or environmental risks among risk assessors and managers, the general public, news media, interest groups, etc.

Risk Management: The process of evaluating and selecting alternative regulatory and non-regulatory responses to risk. The selection process necessarily requires the consideration of legal, economic, and behavioral factors.

River Basin: The land area drained by a river and its tributaries.

Rodenticide: A chemical or agent used to destroy rats or other rodent pests, or to prevent them from damaging food, crops, etc.

Rotary Kiln Incinerator: An incinerator with a rotating combustion chamber that keeps waste moving, thereby allowing it to vaporize for easier burning.

Rough Fish: Fish not prized for eating, such as gar and suckers. Most are more tolerant of changing environmental conditions than game species.

Rubbish: Solid waste, excluding food waste and ashes, from homes, institutions, and work-places.

Run-Off: That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface-water. It can carry pollutants from the air and land into receiving waters.

S

Safener: A chemical added to a pesticide to keep it from injuring plants.

Salinity: The percentage of salt in water.

Salt Water Intrusion: The invasion of fresh surface or ground water by salt water. If it comes from the ocean it may be called sea water intrusion.

Salts: Minerals that water picks up as it passes through the air, over and under the ground, or from households and industry.

Salvage: The utilization of waste materials.

Sanctions: Actions taken by the federal government for failure to plan or implement a State Improvement Plan (SIP). Such action may include withholding of highway funds and a ban on construction of new sources of potential pollution.

Sand Filters: Devices that remove some suspended solids from sewage. Air and bacteria decompose additional wastes passing through the sand so that cleaner water drains from the bed.

Sanitary Landfill: (See: landfills.)

Sanitary Sewers: Underground pipes that carry off only domestic or industrial waste, not storm water.

Sanitary Survey: An on-site review of the water sources, facilities, equipment, operation and maintenance of a public water system to evaluate the adequacy of those elements for producing and distributing safe drinking water.

Sanitary Water (Also known as gray water): Water discharged from sinks, showers, kitchens, or other nonindustrial operations, but not from commodes.

Sanitation: Control of physical factors in the human environment that could harm development, health, or survival.

Saturated Zone: A subsurface area in which all pores and cracks are filled with water under pressure equal to or greater than that of the atmosphere.

Scrap: Materials discarded from manufacturing operations that may be suitable for reprocessing.

Screening: Use of screens to remove coarse floating and suspended solids from sewage.

Science Advisory Board (SAB): A group of external scientists who advise EPA on science and policy.

Scrubber: An air pollution device that uses a spray of water or reactant or a dry process to trap pollutants in emissions.

Secondary Drinking Water Regulations: Non-enforceable regulations applying to public water systems and specifying the maximum contamination levels that, in the judgment of EPA, are required to protect the public welfare. These regulations apply to any contaminants that may adversely affect the odor or appearance of such water and consequently may cause people served by the system to discontinue its use.

Secondary Materials: Materials that have been manufactured and used at least once and are to be used again.

Secondary Treatment: The second step in most publicly owned waste treatment systems in which bacteria consume the organic parts of the waste. It is accomplished by bringing together waste, bacteria, and oxygen in trickling filters or in the activated sludge process. This treatment removes floating and settleable solids and about 90 percent of the oxygen-demanding substances and suspended solids. Disinfection is the final stage of secondary treatment. (See: primary, tertiary treatment.)

Secure Chemical Landfill: (See: landfills.)

Secure Maximum Contaminant Level: Maximum permissible level of a contaminant in water delivered to the free flowing outlet of the ultimate user, or of contamination resulting from corrosion of piping and plumbing caused by water quality.

Sedimentation Tanks: Wastewater tanks in which floating wastes are skimmed off and settled solids are removed for disposal.

Sedimentation: Letting solids settle out of wastewater by gravity during treatment.

Sediments: Soil, sand, and minerals washed from land into water, usually after rain. They pile up in reservoirs, rivers and harbors, destroying fish and wildlife habitat, and clouding the water so that sunlight cannot reach aquatic plants. Careless farming, mining, and building activities will expose sediment materials, allowing them to wash off the land after rainfall.

Seed Protectant: A chemical applied before planting to protect seeds and seedlings from disease or insects.

Seepage: Percolation of water through the soil from unlined canals, ditches, laterals, watercourses, or water storage facilities.

Selective Pesticide: A chemical designed to affect only certain types of pests, leaving other plants and animals unharmed.

Semi-Confined Aquifer: An aquifer partially confined by soil layers of low permeability through which recharge and discharge can still occur.

Senescence: The aging process. Sometimes used to describe lakes or other bodies of water in advanced stages of eutrophication.

Septic Tank: An underground storage tank for wastes from homes not connected to a sewer line. Waste goes directly from the home to the tank, where it is decomposed by bacteria. The sludge settles to the bottom and is pumped out periodically, but effluent flows into the ground through drains.

Service Connector: The pipe that carries tap water from a public water main to a building.

Settleable Solids: Material heavy enough to sink to the bottom of a wastewater treatment tank.

Settling Chamber: A series of screens placed in the way of flue gases to slow the stream of air, thus helping gravity to pull particles into a collection device.

Settling Tank: A holding area for wastewater, where heavier particles sink to the bottom for removal and disposal.

7Q10: Seven-day, consecutive low flow with a ten year return frequency; the lowest stream flow for seven consecutive days that would be expected to occur once in ten years.

Sewage: The waste and wastewater produced by residential and commercial sources and discharged into sewers.

Sewage Lagoon: (See: lagoon.)

Sewage Sludge: Sludge produced at a Publicly Owned Treatment Works, the disposal of which is regulated under the Clean Water Act.

Sewer: A channel or conduit that carries wastewater and storm-water runoff from the source to a treatment plant or receiving stream. "Sanitary" sewers carry household, industrial, and commercial waste. "Storm" sewers carry runoff from rain or snow. "Combined" sewers handle both.

Sewerage: The entire system of sewage collection, treatment, and disposal.

Sharps: Hypodermic needles, syringes (with or without the attached needle) pasteur pipettes, scalpel blades, blood vials, needles with attached tubing, and culture dishes used in animal or human patient care or treatment, or in medical, research or industrial laboratories. Also included are other types of broken or unbroken glassware that were in contact with infectious agents, such as used slides and cover slips, and unused hypodermic and suture needles, syringes, and scalpel blades.

Signal: The volume or product-level change produced by a leak in a tank.

Signal Words: The words used on a pesticide label-Danger, Warning, Caution-to indicate level of toxicity.

Significant Deterioration: Pollution resulting from a new source in previously "clean" areas. (See: prevention of significant deterioration.)

Significant Municipal Facilities: Those publicly owned sewage treatment plants that discharge a million gallons per day or more and are therefore considered by states to have the potential for to substantially effect the quality of receiving waters.

Significant Non-Compliance: (See Significant Violations.)

Significant Violations: Violations by point source dischargers of sufficient magnitude or duration to be a regulatory priority.

Silviculture: Management of forest land for timber. Sometimes contributes to water pollution, as in clear-cutting.

Sinking: Controlling oil spills by using an agent to trap the oil and sink it to the bottom of the body of water where the agent and the oil are biodegraded.

Site Assessment Program: A means of evaluating hazardous waste sites through preliminary assessments and site inspections to develop a Hazard Ranking System score.

Site Inspection: The collection of information from a Superfund site to determine the extent and severity of hazards posed by the site. It follows and is more extensive than a preliminary assessment. The purpose is to gather information necessary to score the site, using the Hazard Ranking System, and to determine if it presents an immediate threat requiring prompt removal.

Site Safety Plan: A crucial element in all removal actions, it includes information on equipment being used, precautions to be taken, and steps to take in the event of an on-site emergency.

Siting: The process of choosing a location for a facility.

Skimming: Using a machine to remove oil or scum from the surface of the water.

Slow Sand Filtration: Passage of raw water through a bed of sand at low velocity, resulting in substantial removal of chemical and biological contaminants.

Sludge: A semi-solid residue from any of a number of air or water treatment processes; can be a hazardous waste.

Sludge Digester: Tank in which complex organic substances like sewage sludges are biologically dredged. During these reactions, energy is released and much of the sewage is converted to methane, carbon dioxide, and water.

Slurry: A watery mixture of insoluble matter resulting from some pollution control techniques.

Small Quantity Generator (SQG-sometimes referred to as "Squeegee"): Persons or enterprises that produce 220-2200 pounds per month of hazardous waste; are required to keep more records than conditionally exempt generators. The largest category of hazardous waste generators, SQGs include automotive shops, dry cleaners, photographic developers, and a host of other small businesses. (See: conditionally exempt generators).

Smelter: A facility that melts or fuses ore, often with an accompanying chemical change, to separate its metal content. Emissions cause pollution. "Smelting" is the process involved.

Smog: Air pollution associated with oxidants. (See: photochemical smog.)

Smoke: Particles suspended in air after incomplete combustion.

Soft Detergents: Cleaning agents that break down in nature.

Soft Water: Any water that does not contain a significant amount of dissolved minerals such as salts of calcium or magnesium.

Soil Adsorption Field: A sub-surface area containing a trench or bed with clean stones and a system of piping through which treated sewage may seep into the surrounding soil for further treatment and disposal.

Soil and Water Conservation Practices: Control measures consisting of managerial, vegetative, and structural practices to reduce the loss of soil and water.

Soil Conditioner: An organic material like humus or compost that helps soil absorb water, build a bacterial community, and take up mineral nutrients.

Soil Erodibility: An indicator of a soil's susceptibility to raindrop impact, runoff, and other erosive processes.

Soil Gas: Gaseous elements and compounds in the small spaces between particles of the earth and soil. Such gases can be moved or driven out under pressure.

Soil Sterilant: A chemical that temporarily or permanently prevents the growth of all plants and animals, depending on the chemical.

Sole-Source Aquifer: An aquifer that supplies 50-percent or more of the drinking water of an area.

Solid Waste: Non-liquid, non-soluble materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes also include sewage sludge, agricultural refuse, demolition wastes, and mining residues. Technically, solid waste also refers to liquids and gases in containers.

Solid Waste Disposal: The final placement of refuse that is not salvaged or recycled.

Solid Waste Management: Supervised handling of waste materials from their source through recovery processes to disposal.

Solidification and Stabilization: Removal of wastewater from a waste or changing it chemically to make it less permeable and susceptible to transport by water.

Soot: Carbon dust formed by incomplete combustion.

Sorption: The action of soaking up or attracting substances; process used in many pollution control systems.

Source Reduction: Reducing the amount of materials entering the waste stream by redesigning products or patterns of production or consumption (e.g., using returnable beverage containers). Synonymous with waste reduction.

Source Separation: Segregating various wastes at the point of generation (e.g., separation of paper, metal and glass from other wastes to make recycling simpler and more efficient.)

Special Review: Formerly known as Rebuttable Presumption Against Registration (RPAR), this is the regulatory process through which existing pesticides suspected of posing unreasonable risks to human health, non-target organisms, or the environment are referred for review by EPA. Such review requires an intensive risk/benefit analysis with opportunity for public comment. If risk is found to outweigh social and economic benefits, regulatory actions ranging from label revisions and use-restriction to cancellation or suspended registration can be initiated.

Special Waste: Items such as household hazardous waste, bulky wastes (refrigerators, pieces of furniture, etc.) tires, and used oil.

Species: A reproductively isolated aggregate of interbreeding organisms.

Spill Prevention Control and Countermeasures Plan (SPCCP): Plan covering the release of hazardous substances as defined in the Clean Water Act.

Spoil: Dirt or rock removed from its original location-destroying the composition of the soil in the process-as in strip-mining, dredging, or construction.

Sprawl: Unplanned development of open land.

Spray Tower Scrubber: A device that sprays alkaline water into a chamber where acid gases present to aid in the neutralizing of the gas.

Stable Air: A motionless mass of air that holds instead of dispersing pollutants.

Stabilization: Conversion of the active organic matter in sludge into inert, harmless material.

Stack: A chimney, smokestack, or vertical pipe that discharges used air.

Utilization Ponds: (See: lagoon.)

Stack Effect: Air, as in a chimney, that moves upward because it is warmer than the ambient atmosphere.

Stack Gas: (See: flue gas.)

Stage II Controls: Systems placed on service station gasoline pumps to control and capture gasoline vapors during refueling.

Stagnation: Lack of motion in a mass of air or water that holds pollutants in place.

Standards: Norms that impose limits on the amount of pollutants or emissions produced. EPA establishes minimum standards, but states are allowed to be stricter.

Start of a Response Action: The point in time when there is a guarantee or set-aside of funding either by EPA, other federal agencies, states or Principal Responsible Parties in order to begin response actions at a Superfund site.

State Emergency Response Commission (SERC): Commission appointed by each state governor according to the requirements of SARA Title III. The SERCs designate emergency planning districts, appoint local emergency planning committees, and supervise and coordinate their activities.

State Implementation Plans (SIP): EPA approved state plans for the establishment, regulation, and enforcement of air pollution standards.

Stationary Source: A fixed-site producer of pollution, mainly power plants and other facilities using industrial combustion processes.

Storage: Temporary holding of waste pending treatment or disposal, as in containers, tanks, waste piles, and surface impoundments.

Storm Sewer: A system of pipes (separate from sanitary sewers) that carries only water runoff from buildings and land surfaces.

Stratification: Separating into layers.

Stratosphere: The portion of the atmosphere 10-to-25 miles above the earth's surface.

Strip-Cropping: Growing crops in a systematic arrangement of strips or bands that serve as barriers to wind and water erosion.

Strip-Mining: A process that uses machines to scrape soil or rock away from mineral deposits just under the earth's surface.

Structural Deformation: Distortion in walls of a tank after liquid has been added or removed.

Sulfur Dioxide (SO₂): A pungent, colorless, gaseous pollutant formed primarily by the combustion of fossil fuels.

Sump: A pit or tank that catches liquid runoff for drainage or disposal.

Supercritical Water: A type of thermal treatment using moderate temperatures and high pressures to enhance the ability of water to break down large organic molecules into smaller, less toxic ones. Oxygen injected during this process combines with simple organic compounds to form carbon dioxide and water.

Superfund: The program operated under the legislative authority of CERCLA and SARA that funds and carries out EPA solid waste emergency and long-term removal and remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority, and conducting and/or supervising the cleanup and other remedial actions.

Superfund Innovative Technology Evaluation: EPA program to promote development and use of innovative treatment technologies in Superfund site cleanups.

Surface Impoundment: Treatment, storage, or disposal of liquid hazardous wastes in ponds.

Surface Uranium Mines: Strip mining operations for removal of uranium-bearing ore.

Surface Water: All water naturally open to the atmosphere (rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc.) and all springs, wells, or other collectors directly influenced by surface water.

Surfacing ACM: Asbestos-containing material that is sprayed or troweled on or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members.

Surfacing Material: Material sprayed or troweled onto structural members (beams, columns, or decking) for fire protection; or on ceilings or walls for fireproofing, acoustical or decorative purposes. Includes textured plaster, and other textured wall and ceiling surfaces.

Surfactant: A detergent compound that promotes lathering.

Surveillance System: A series of monitoring devices designed to check on environmental conditions.

Suspect Material: Building material suspected of containing asbestos, e.g., surfacing material, floor tile, ceiling tile, thermal system insulation, and miscellaneous other materials.

Suspended Loads: Sediment particles maintained in the water column by turbulence and carried with the flow of water.

Suspended Solids: Small particles of solid pollutants that float on the surface of, or are suspended in, sewage or other liquids. They resist removal by conventional means.

Suspension: Suspending the use of a pesticide when EPA deems it necessary to prevent an imminent hazard resulting from its continued use. An emergency suspension takes effect immediately; under an ordinary suspension a registrant can request a hearing before the suspension goes into effect. Such a hearing process might take six months.

Suspension Culture: Cells growing in a liquid nutrient medium.

Swamp: A type of wetland dominated by woody vegetation but without appreciable peat deposits. Swamps may be fresh or salt water and tidal or non-tidal. (See: wetland.)

Synthetic Organic Chemicals (SOCs): Man-made organic chemicals. Some SOC's are volatile, others tend to stay dissolved in water instead of evaporating.

Systemic Pesticide: A chemical absorbed by an organism that makes the organism toxic to pests.

T

Tailings: Residue of raw material or waste separated out during the processing of crops or mineral ores.

Tail Water: The runoff of irrigation water from the lower end of an irrigated field.

Technical Assistance Grant (TAG): As part of the Superfund program, Technical Assistance Grants of up to \$50,000 are provided to citizens' groups to obtain assistance in interpreting information related to cleanups at Superfund sites or those proposed for the National Priorities List. Grants are used by such groups to hire technical advisors to help them understand the site-related technical information for the duration of response activities.

Technology-Based Limitations: Industry-specific effluent limitations applied to a discharge when it will not cause a violation of water quality standards at low stream flows. Usually applied to discharges into large rivers.

Technology-Based Standards: Effluent limitations applicable to direct and indirect sources which are developed on a category-by-category basis using statutory factors, not including water-quality effects.

Terracing: Dikes built along the contour of sloping farm land that hold runoff and sediment to reduce erosion.

Tertiary Treatment: Advanced cleaning of wastewater that goes beyond the secondary or biological stage, removing nutrients such as phosphorus, nitrogen, and most BOD and suspended solids.

Thermal Pollution: Discharge of heated water from industrial processes that can kill or injure aquatic organisms.

Thermal System Insulation (TSI): Asbestos-containing material applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain or water condensation.

Thermal Treatment: Use of elevated temperatures to treat hazardous wastes. (See: incineration; pyrolysis.)

Threshold Limit Value (TLV): The concentration of an airborne substance that an average person can be repeatedly exposed to without adverse effects. TLVs may be expressed in three ways: TLV-TWA-Time weighted average, based on an allowable exposure averaged over a normal 8-hour workday or 40-hour workweek; TLV-STEL-Short-term exposure limit or maximum concentration for a brief specified period of time, depending on a specific chemical (TWA must still be met); and TLV-C-Ceiling Exposure Limit or maximum exposure concentration not to be exceeded under any circumstances. (TWA must still be met.)

Threshold Planning Quantity: A quantity designated for each chemical on the list of extremely hazardous substances that triggers notification by facilities to the State Emergency Response Commission that such facilities are subject to emergency planning requirements under SARA Title III.

Tidal Marsh: Low, flat marshlands traversed by channels and tidal hollows, subject to tidal inundation; normally, the only vegetation present is salt-tolerant bushes and grasses. (See: wetlands.)

Time-weighted Average (TWA): In air sampling, the average air concentration of contaminants during a given period.

Tolerances: Permissible residue levels for pesticides in raw agricultural produce and processed foods. Whenever a pesticide is registered for use on a food or a feed crop, a tolerance (or exemption from the tolerance requirement) must be established. EPA establishes the tolerance levels, which are enforced by the Food and Drug Administration and the Department of Agriculture.

Tonnage: The amount of waste that a landfill accepts, usually expressed in tons per month. The rate at which a landfill accepts waste is limited by the landfill's permit.

Topography: The physical features of a surface area including relative elevations and the position of natural and man-made features.

Total Dissolved Phosphorous: The total phosphorous content of all material that will pass through a filter, which is determined as orthophosphate without prior digestion or hydrolysis. Also called soluble P. or ortho P.

Total Dissolved Solids (TDS): All material that passes the standard glass river filter; now called total filtrable residue. Term is used to reflect salinity.

Total Suspended Solids (TSS): A measure of the suspended solids in wastewater, effluent, or water bodies, determined by tests for "total suspended non-filterable solids." (See: suspended solids.)

Toxic Chemical Release Form: Information form required of facilities that manufacture, process, or use (in quantities above a specific amount) chemicals listed under SARA Title III.

Toxic Chemical: Any chemical listed in EPA rules as "Toxic Chemicals Subject to Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986."

Toxic Chemical Use Substitution: Replacing toxic chemicals with less harmful chemicals in industrial processes.

Toxic Cloud: Airborne plume of gases, vapors, fumes, or aerosols containing toxic materials.

Toxic Pollutants: Materials that cause death, disease, or birth defects in organisms that ingest or absorb them. The quantities and exposures necessary to cause these effects can vary widely.

Toxic Release Inventory: Database of toxic releases in the United States compiled from SARA Title III section 313 reports.

Toxic Substance: A chemical or mixture that may present an unreasonable risk of injury to health or the environment.

Toxic Waste: A waste that can produce injury if inhaled, swallowed, or absorbed through the skin.

Toxicity Testing: Biological testing (usually with an invertebrate, fish, or small mammal) to determine the adverse effects of a compound or effluent.

Toxicological Profile: An examination, summary, and interpretation of a hazardous substance to determine levels of exposure and associated health effects.

Transpiration: The process by which water vapor is lost to the atmosphere from living plants. The term can also be applied to the quantity of water thus dissipated.

Transportation Control Measures (TCMs): Steps taken by a locality to adjust traffic patterns (e.g., bus lanes, turnout, right turn on red) or reduce vehicle use (ride sharing, high-occupancy vehicle lanes) to cut vehicular emissions.

Trash: Material considered worthless or offensive that is thrown away. Generally defined as dry waste material, but in common usage it is a synonym for garbage, rubbish, or refuse.

Treatability Studies: Tests of potential cleanup technologies conducted in a laboratory (See: bench-scale tests.)

Trash-to-Energy Plan: Burning trash to produce energy.

Treated Regulated Medical Waste: Medical waste treated to substantially reduce or eliminate its pathogenicity, but that has not yet been destroyed.

Treatment Plant: A structure built to treat wastewater before discharging it into the environment.

Treatment, Storage, and Disposal Facility: Site where a hazardous substance is treated, stored, or disposed of. TSD facilities are regulated by EPA and states under RCRA.

Treatment: (1) Any method, technique, or process designed to remove solids and/or pollutants from solid waste, wastestreams, effluents, and air emissions. (2) methods used to change the biological character or composition of any regulated medical waste so as to substantially reduce or eliminate its potential for causing disease.

Trial Burn: An incinerator test in which emissions are monitored for the presence of specific organic compounds, particulates, and hydrogen chloride.

Trichloroethylene (TCE): A stable, low boiling-point colorless liquid, toxic if inhaled. Used as a solvent or metal decreasing agent, and in other industrial applications.

Trickling Filter: A coarse treatment system in which wastewater is trickled over a bed of stones or other material covered with bacteria that break down the organic waste and produce clean water.

Trickle Irrigation: Method in which water drips to the soil from perforated tubes or emitters.

Trihalomethane (THM): One of a family of organic compounds named as derivative of methane. THMs are generally by-products of chlorination of drinking water that contains organic material.

Trust Fund (CERCLA): A fund set up under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to help pay for cleanup of hazardous waste sites and for legal action to force those responsible for the sites to clean them up.

Tundra: A type of ecosystem dominated by lichens, mosses, grasses, and woody plants. Tundra is found at high latitudes (arctic tundra) and high altitudes (alpine tundra). Arctic tundra is underlain by permafrost and is usually saturated. (See: wetlands.)

Turbidimeter: A device that measures the density of suspended solids in a liquid.

Turbidity: 1. Haziness in air caused by the presence of particles and pollutants. 2. A cloudy condition in water due to suspended silt or organic matter.

U

Ultra Clean Coal (UCC): Coal that is mined, ground into fine particles, then chemically treated to remove sulfur, ash, silicone, and other substances; usually briquetted and coated with a sealant made from coal.

Ultraviolet Rays: Radiation from the sun that can be useful or potentially harmful. UV rays from one part of the spectrum (UV-A) enhance plant life and are useful in some medical and dental procedures; UV rays from other parts of the spectrum (UV-B) can cause skin cancer or other tissue damage. The ozone layer in the atmosphere partly shields us from ultraviolet rays reaching the earth's surface.

Underground Injection Control (UIC): The program under the Safe Drinking Water Act that regulates the use of wells to pump fluids into the ground.

Underground Sources of Drinking Water: Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solids content of 10,000 milligrams per liter or less, and are not "exempted aquifers." (See: exempted aquifer.)

Underground Storage Tank: A tank located at least partially underground and designed to hold gasoline or other petroleum products or chemicals.

Unreasonable Risk: Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), "unreasonable adverse effects" means any unreasonable risk to man or the environment, taking into account the medical, economic, social, and environmental costs and benefits of any pesticide.

Unsaturated Zone: The area above the water table where soil pores are not fully saturated, although some water may be present.

Uranium Mill Tailings Piles: Former uranium ore processing sites that contain leftover radioactive materials (wastes), including radium and unrecovered uranium.

Uranium Mill-Tailings Waste Piles: Licensed active mills with tailings piles and evaporation ponds created by acid or alkaline leaching processes.

Urban Runoff: Storm water from city streets and adjacent domestic or commercial properties that carries pollutants of various kinds into the sewer systems and receiving waters.

Utility Load: The total electricity demand for a utility district.

V

Vapor Capture System: Any combination of hoods and ventilation system that captures or contains organic vapors so they may be directed to an abatement or recovery device.

Vapor Dispersion: The movement of vapor clouds in air due to wind, thermal action, gravity spreading, and mixing.

Vapor Plumes: Flue gases visible because they contain water droplets.

Variance: Government permission for a delay or exception in the application of a given law, ordinance, or regulation.

Vector: 1. An organism, often an insect or rodent, that carries disease. 2. Plasmids, viruses, or bacteria used to transport genes into a host cell. A gene is placed in the vector; the vector then "infects" the bacterium.

Vehicle Miles Travelled (VMT): A measure of the extent of motor vehicle operation; the total number of vehicle miles travelled within a specific geographic area over a given period of time.

Ventilation/Suction: The act of admitting fresh air into a space in order to replace stale or contaminated air; achieved by blowing air into the space. Similarly, suction represents the admission of fresh air into an interior space by lowering the pressure outside of the space, thereby drawing the contaminated air outward.

Venturi Scrubbers: Air pollution control devices that use water to remove particulate matter from emissions.

Vinyl Chloride: A chemical compound, used in producing some plastics, that is believed to be oncogenic.

Virgin Materials: Resources extracted from nature in their raw form, such as timber or metal ore.

Volatile: Any substance that evaporates readily.

Volatile Organic Compound (VOC): Any organic compound that participates in atmospheric photochemical reactions except those designated by EPA as having negligible photochemical reactivity.

Volatile Synthetic Organic Chemicals: Chemicals that tend to volatilize or evaporate.

Volume Reduction: Processing waste materials to decrease the amount of space they occupy, usually by compacting or shredding, incineration, or composting.

Volumetric Tank Test: One of several tests to determine the physical integrity of a storage tank; the volume of fluid in the tank is measured directly or calculated from product-level changes. A marked drop in volume indicates a leak.

Vulnerable Zone: An area over which the airborne concentration of a chemical accidentally released could reach the level of concern.

Vulnerability Analysis: Assessment of elements in the community that are susceptible to damage should a release of hazardous materials occur.

W

Waste: 1. Unwanted materials left over from a manufacturing process. 2. Refuse from places of human or animal habitation.

Waste Characterization: Identification of chemical and microbiological constituents of a waste material.

Waste Exchange: Arrangement in which companies exchange their wastes for the benefit of both parties.

Waste Feed: The continuous or intermittent flow of wastes into an incinerator.

Waste Load Allocation: The maximum load of pollutants each discharger of waste is allowed to release into a particular waterway. Discharge limits are usually required for each specific water quality criterion being, or expected to be, violated. The portion of a stream's total assimilative capacity assigned to an individual discharge.

Waste Minimization: Measures or techniques that reduce the amount of wastes generated during industrial production processes; term is also applied to recycling and other efforts to reduce the amount of waste going into the waste stream.

Waste Reduction: Using source reduction, recycling, or composting to prevent or reduce waste generation.

Waste Stream: The total flow of solid waste from homes, businesses, institutions, and manufacturing plants that are recycled, burned, or disposed of in landfills, or segments thereof such as the "residential waste stream" or the "recyclable waste stream."

Waste Treatment Lagoon: Impoundment made by excavation or earth fill for biological treatment of wastewater.

Waste Treatment Plant: A facility containing a series of tanks, screens, filters and other processes by which pollutants are removed from water.

Waste Treatment Stream: The continuous movement of waste from generator to treater and disposer.

Wastewater: The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.

Wastewater Infrastructure: The plan or network for the collection, treatment, and disposal of sewage in a community. The level of treatment will depend on the size of the community, the type of discharge, and/or the designated use of the receiving water.

Wastewater Operations and Maintenance: Actions taken after construction to assure that facilities constructed to treat wastewater will be operated, maintained, and managed to reach prescribed effluent levels in an optimum manner.

Water Pollution: The presence in water of enough harmful or objectionable material to damage the water's quality.

Water Purveyor: A public utility, mutual water company, county water district, or municipality that delivers drinking water to customers.

Water Quality Criteria: Levels of water quality expected to render a body of water suitable for its designated use. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes.

Water Quality Standards: State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

Water Quality-Based Limitations: Effluent limitations applied to dischargers when mere technology-based limitations would cause violations of water quality standards. Usually applied to discharges into small streams.

Water Quality-Based Permit: A permit with an effluent limit more stringent than one based on technology performance. Such limits may be necessary to protect the designated use of receiving waters (i.e., recreation, irrigation, industry or water supply).

Water Solubility: The maximum possible concentration of a chemical compound dissolved in water. If a substance is water soluble it can very readily disperse through the environment.

Water Supplier: One who owns or operates a public water system.

Water Supply System: The collection, treatment, storage, and distribution of potable water from source to consumer.

Water Table: The level of groundwater.

Watershed: The land area that drains into a stream.

Well Injection: The subsurface emplacement of fluids into a well.

Well Monitoring: Measurement by on-site instruments or laboratory methods of well water quality.

Well Plug: A watertight, gastight seal installed in a bore hole or well to prevent movement of fluids.

Wellhead Protection Area: A protected surface and subsurface zone surrounding a well or wellfield supplying a public water system to keep contaminants from reaching the well water.

Wetlands: An area that is saturated by surface or ground water with vegetation adapted for life under those soil conditions, as swamps, bogs, fens, marshes, and estuaries.

Wildlife Refuge: An area designated for the protection of wild animals, within which hunting and fishing are either prohibited or strictly controlled.

Wood-Burning-Stove Pollution: Air pollution caused by emissions of particulate matter, carbon monoxide, total suspended particulates, and polycyclic organic matter from wood-burning stoves.

Wood Treatment Facility: An industrial facility that treats lumber and other wood products for outdoor use. The process employs chromated copper arsenate, which is regulated as a hazardous material.

Working Level Month (WLM): A unit of measure used to determine cumulative exposure to radon.

Working Level (WL): A unit of measure for documenting exposure to radon decay products, the so-called "daughters". One working level is equal to approximately 200 picocuries per liter.

X Y Z

Xenobiote: Any biotum displaced from its normal habitat; a chemical foreign to a biological system.

Yard Waste: The part of solid waste composed of grass clippings, leaves, twigs, branches, and garden refuse.

Yellow-Boy: Iron oxide flocculent (clumps of solids in waste or water); usually observed as orange-yellow deposits in surface streams with excess iron content. (See: floc, flocculation.)

Z-list: OSHA's tables of toxic and hazardous air contaminants.

Zone of Saturation: (See: saturated zone.)

Zooplankton: Tiny aquatic animals eaten by fish.

● United States Marine Corps

Base Realignment and Closure Business Plan



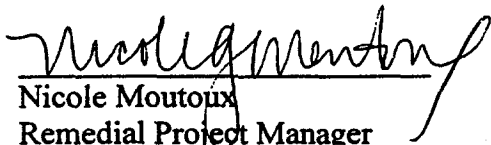
**For
Marine Corps Air Station
El Toro, CA**

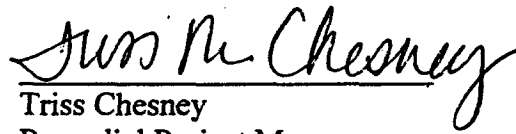
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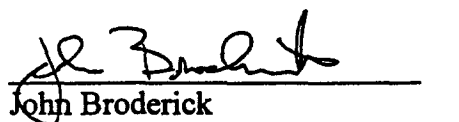
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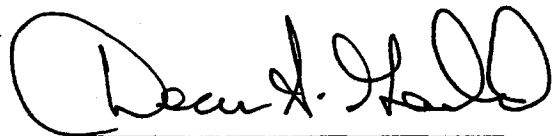
BASE REALIGNMENT AND CLOSURE
(BRAC) BUSINESS PLAN

This BRAC Business Plan provides current summary information on the status of and strategies for the cleanup of the Marine Corps Air Station, El Toro. We, the BRAC Cleanup Team, with consideration of community and stakeholder advice, have cooperatively developed this plan to provide for safe, effective, timely, and cost-efficient environmental restoration and productive reuse of the closed DoD facility. This plan will be updated periodically to reflect new information regarding the environmental condition of property, reuse priorities, and availability of funds.


Nicole Moutoux
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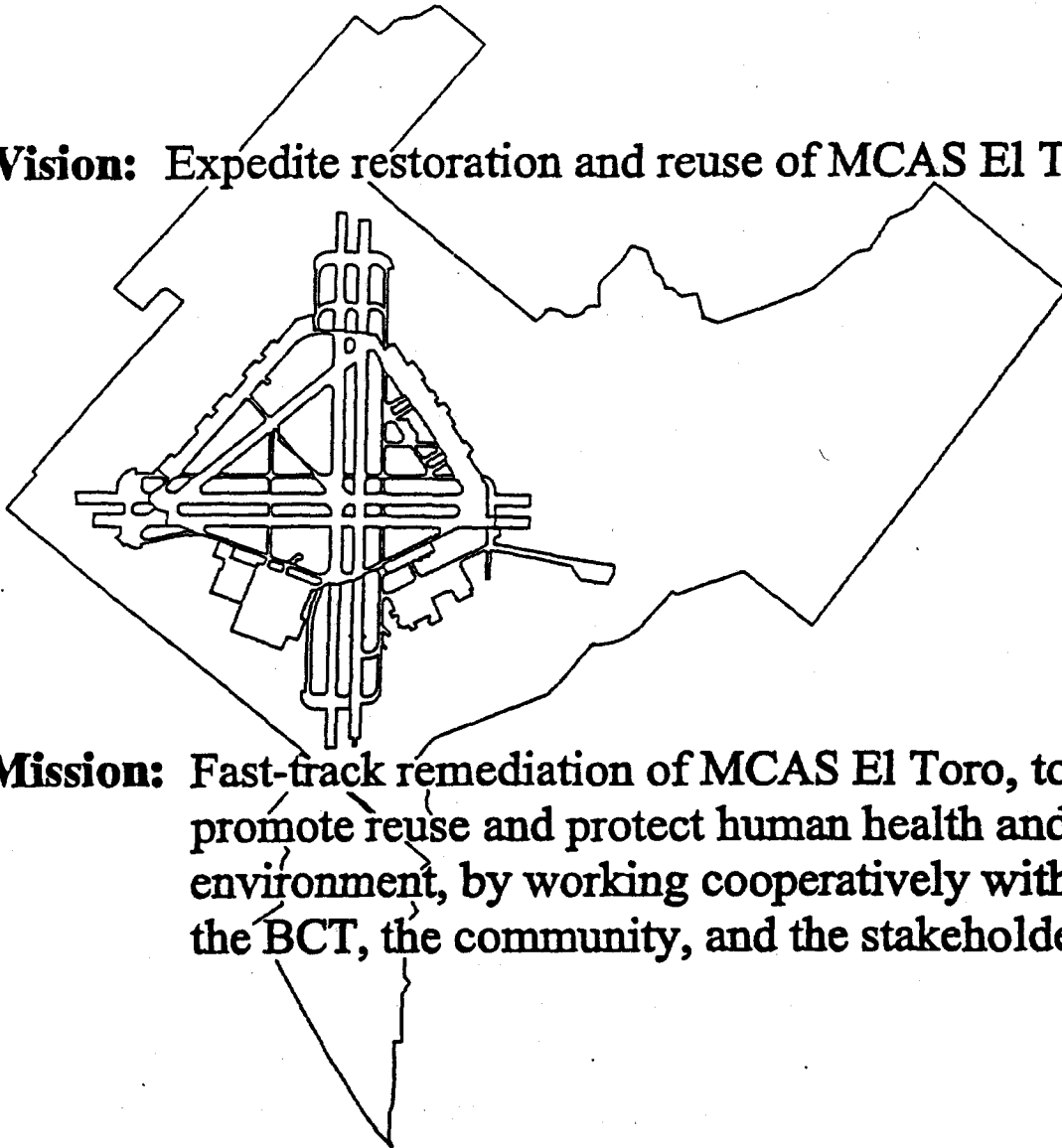

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Vision and Mission Statements

Vision: Expedite restoration and reuse of MCAS El Toro.



Mission: Fast-track remediation of MCAS El Toro, to promote reuse and protect human health and the environment, by working cooperatively with the BCT, the community, and the stakeholders.

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INTRODUCTION SECTION

NOTE: The Introduction Section serves as an “Executive Summary” of the complete document. To look at tables, figures and attachments referenced in the Introduction, please consult the complete document. It is available at two locations: (1) the Administrative Record File, located at MCAS El Toro, Base Realignment and Closure Office, Building 368 – contact Ms. Charly Wiemart at (949) 726-2840 to arrange an appointment; (2) the MCAS El Toro Information Repository located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, phone number (949) 551-7151.

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INTRODUCTION SECTION

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INTRODUCTION

The Department of the Navy (DoN) completed the realignment and closure of Marine Corps Air Station (MCAS) El Toro (Station) on 2 July 1999, in accordance with the Base Realignment and Closure Act (1993) (BRAC III). In 1993, the DoN organized a Base Realignment and Closure (BRAC) Cleanup Team (BCT) to manage and coordinate closure activities and to prepare an annual BRAC Cleanup Plan (BCP). The DoN published the initial BCP in 1994 and issued annual updates in 1995, 1996, 1997, 1998, and 1999. In 1999, the BCT agreed to publish a BRAC Business Plan (Business Plan) for the Year 2000 update. The DoN established the Business Plan, a ten to fifteen page document that is comparable to an extended executive summary, as an alternative to the BCP for installations with continuing environmental restoration programs. The Business Plan provides the status of, management and response strategies for, and action items related to the environmental restoration and compliance programs at MCAS El Toro. The Business Plan presents information available as of 31 December 2000, and describes the most significant environmental Locations of Concern, the acceleration initiatives implemented at MCAS El Toro, and BRAC projects under way. Exhibits, tables, and figures provide additional information pertaining to the environmental Locations of Concern.

The scope of the Business Plan considers the following regulatory mechanisms:

- BRAC III;
- National Environmental Policy Act (NEPA);
- Resource Conservation and Recovery Act (RCRA);
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act and the Community Environmental Response Facilitation Act (CERFA); and
- other applicable state and local laws.

MCAS El Toro was listed on the National Priorities List under CERCLA in February 1990, and the DoN, the United States Environmental Protection Agency, Region 9, the California Department of Health Services (part of which is now the California Department of Toxic Substances Control), and the California Regional Water Quality Control Board, Santa Ana Region entered into a Federal Facilities Agreement (FFA) which establishes a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions. The Business Plan is a planning document; therefore, the information and assumptions presented may not have complete approval from the federal and state regulatory agencies. The Business Plan is a dynamic document that is updated regularly to reflect the current status of response actions and the changes in strategies or plans that affect the ultimate restoration and disposal of MCAS El Toro property. Comments from various sources, including major claimants, DoN activities, and federal and state regulatory agencies, were evaluated and considered for inclusion during the preparation of this Business Plan.

STATUS OF DISPOSAL, REUSE, AND INTERIM LEASE PROCESS

In March 1994, the County of Orange (County), along with the Cities of Irvine and Lake Forest, formed a joint powers authority to develop a reuse plan for MCAS El Toro. In January 1995, the County withdrew from the joint powers authority in response to the passage of Measure A, a countywide ballot initiative approved by Orange County voters in November 1994. Measure A anticipates that the principal feature of a County-adopted reuse plan for MCAS El Toro should be a commercial airport. Measure A also established the 13-member El Toro Airport Citizens Advisory Commission to advise the Board of Supervisors and Orange County Planning Commission on base reuse.

In April 1995, the Office of Economic Adjustment formally recognized the Orange County Board of Supervisors as the official Local Redevelopment Authority (LRA) for MCAS El Toro. As the recognized LRA, the Board of Supervisors was given sole responsibility for preparing a Community Reuse Plan (CRP) for submittal to the DoN. Eight Department of Defense (DoD) and federal agencies submitted formal applications for MCAS El Toro property during the federal screening process.

The LRA provided its recommendations on each of these requests to the Assistant Secretary of the Navy in early 1995. The LRA has endorsed requests by the Department of Interior (DOI) for the Habitat Reserve, the Federal Aviation Administration, and the California Air National Guard. The LRA recommended that the remaining requests be denied. No surplus property determination has been made. Currently, no transfer actions have been approved by the Assistant Secretary of the Navy.

In the March 1995 final Environmental Baseline Survey (EBS) Report (Jacobs Engineering Group, 1995), approximately 63 percent of the total 4,738 acres of real property at the Station was categorized as eligible under CERFA for transfer as uncontaminated property or Environmental Condition of Property (ECP) Type 1. ECP types are described in Exhibit 1.

Exhibit 1. Environmental Condition of Property (ECP) Types

ECP Type	Description
1	Areas where no release or disposal of hazardous substances or petroleum products (including migration) has occurred.
2	Areas where only release or disposal of petroleum products has occurred.
3	Areas of contamination below action levels.
4	Areas where all remedial action has been taken.
5	Areas of known contamination with removal and/or remedial action underway.
6	Areas of known contamination where required response actions have not been implemented.
7	Areas that are unevaluated or that require further evaluation.

Since the 1995 EBS, additional property has been categorized as area type 1. Property designated as area types 1 through 4 is environmentally suitable for transfer by deed. This property type now totals approximately 87 percent of the Station property. The remaining real property is identified as area types 5, 6, and 7. The real extent of land classified as area types 5,

6, and 7 is approximately 252 acres (5 percent), 323 acres (7 percent), and 3 acres (less than 1 percent), respectively.

In the fall of 1995, the LRA conducted the state/local and homeless provider screening process in accordance with the Base Closure Community Redevelopment and Homeless Assistance Act of 1994 and implementing regulations issued by the DoD and the U.S. Department of Housing and Urban Development (HUD) in August 1995.

The LRA prepared a final CRP and draft Environmental Impact Report (EIR), which evaluated three reuse alternatives for the Station. Reuse Alternative A - Commercial Passenger/Cargo Use (the proposed project) - provided for a full service commercial passenger and cargo airport and compatible non-aviation uses. Reuse Alternative B -Cargo/General Aviation Use - provided for a cargo and general aviation airport and compatible non-aviation uses. Reuse Alternative C - Non-aviation-provided for non-aviation uses including an educational campus, visitor-oriented attractions, research and development, and other uses.

In August 1996, the LRA issued the draft MCAS El Toro CRP, Homeless Assistance Submission (HAS) and draft EIR for a 67-day public review and comment period. The written public comment period ended on 15 October 1996. In the fall of 1996, the Orange County Airport Commission, the El Toro Airport Citizens Advisory Commission, and the Orange County Planning Commission conducted public meetings/hearings and adopted recommendations to the Board of Supervisors on the draft CRP, HAS and EIR.

On 11 December 1996, the Board of Supervisors adopted the final MCAS El Toro CRP (P&D Consultants Team, December 1996), which provides for a more detailed study of a full-service commercial passenger and cargo airport, as well as compatible non-aviation uses.

The final CRP also incorporates the LRA's previously transmitted recommendations on each of the DoD and federal agency requests for property at the base and the 47 Notice Of Interest applications submitted during the state/local and homeless provider screening process conducted by the LRA. The final CRP and HAS were submitted to the Assistant Secretary of the Navy and the Secretary of HUD on 13 December 1996.

The scheduling and prioritizing of parcels for reuse based on the final CRP was provided by the LRA in 1997. The closure programs summarized in this Business Plan are not anticipated to be adversely impacted by the LRA's parcel prioritization schedule.

The Bake Parkway/Interstate 5 public highway expansion project was completed and resulted in the transfer of approximately 25 acres of MCAS El Toro property in 1998.

In June 1999, Cooperative Agreement N68711-99-2-6504 for caretaker services to protect, secure, and maintain MCAS El Toro was executed with the County of Orange, extending through 31 August 2000. The expiration of the cooperative agreement for caretaker services was concurrent with the execution of a Master Lease, effective 31 August 2000.

DoN prepared a Finding of Suitability to Lease (FOSL) and entered into an interim lease with the County of Orange in July 1999 for post-closure use of the following areas: the Golf Course (approximately 225 acres); the Child Development Center (Buildings 656 and 873); the Officers' Club (Building 791); the Horse Stables (approximately 30 acres); the Recreational Vehicle (RV) Storage Area; the Indoor Training Pool (Building 839); and Building 83. The areas addressed in this lease were incorporated into the Master Lease that was executed on 31 August 2000. The Master Lease has a term of five (5) years beginning on 1 September 2000, and the terms and conditions of the Master Lease are identified in the *Interim Lease Between The United States of America and County of Orange, California For Property at Marine Corps Air Station, El Toro* dated 31 August 2000.

The County of Orange identified a detailed proposed reuse plan for MCAS El Toro in the Draft Environmental Impact Report (EIR 573) in December 1999, and the proposed future land uses are identified on Figure 2 of this Business Plan.

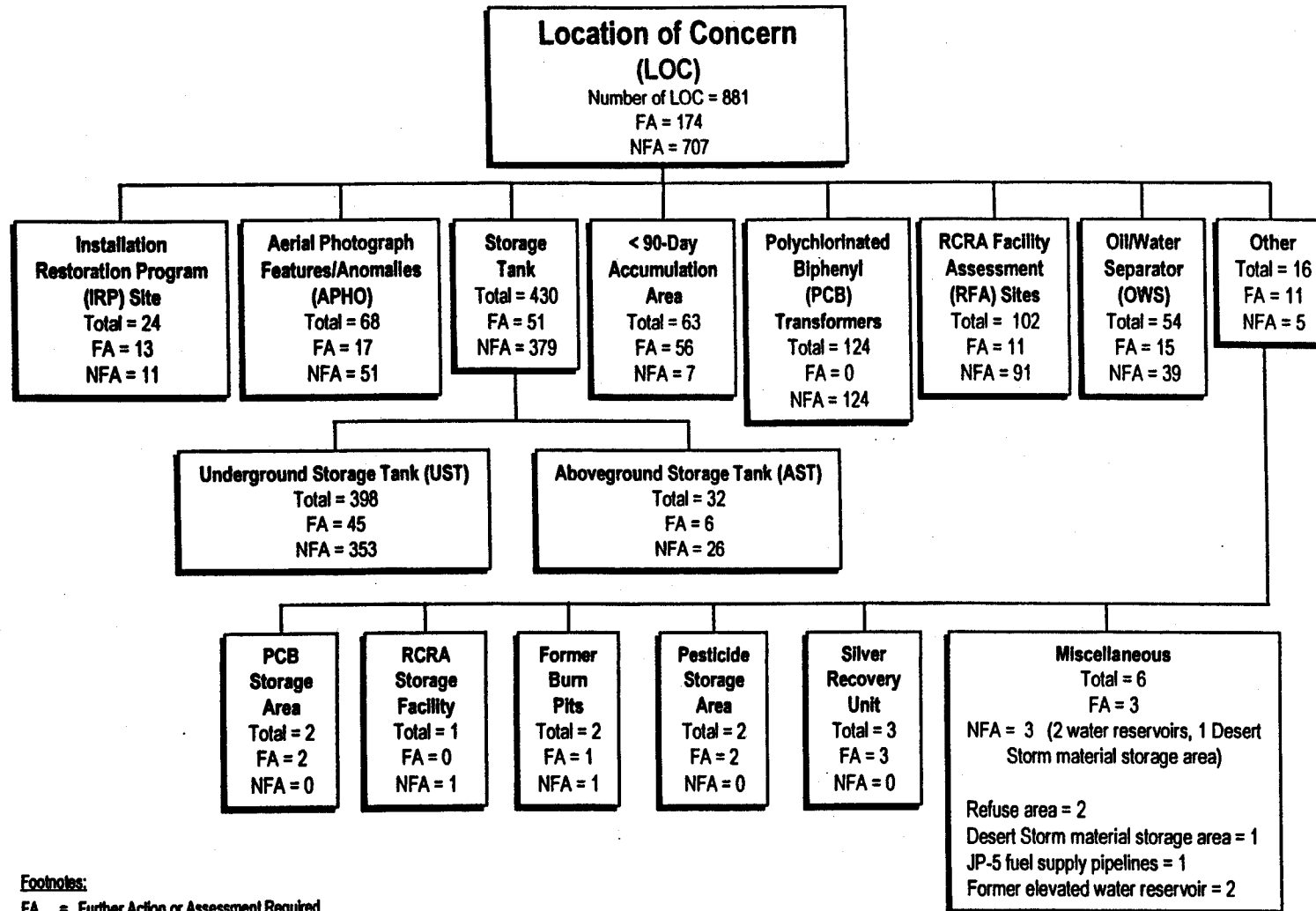
STATUS OF ENVIRONMENTAL RESTORATION PROGRAM

A total of 881 environmental Locations of Concern (LOCs), including twenty-four (24) Installation Restoration Program Sites (Sites), have been identified at MCAS El Toro. A LOC is defined as any identified location or area that is potentially contaminated or is a potential source of contamination. Several new LOCs were added to the program during 2000: Underground Storage Tank (UST) 324G, Above-ground Storage Tank (AST) 1, AST 730, AST 374A, AST 374B, AST 374C, AST 374D, and AST 374E.

Seven (7) LOCs were deleted from the program as phantom or non-existent LOCs. Record search activities, visual inspections, and cognizant regulatory agency concurrence were documented prior to deleting the LOCs from the program. Regulatory agency correspondence pertaining to the phantom LOCs has been placed in the Administrative Record. Deleted were the following LOCs: UST 473A, UST 374B, UST 5101, TAA 29A, TAA 29B, OWS 850, and OWS 851.

Exhibits 2, 3 and 4 summarize the types, numbers, and status of different LOCs at the Station.

**Exhibit 2 - Location of Concern Distribution
(as of 31 December 2000)**



Footnotes:

FA = Further Action or Assessment Required

NFA = No Further Action Required

Exhibit 3 – Distribution of 881 LOCs (as of 31 December 2000)

	IRP SITES	APHO SITES	STORAGE TANK SITES	<90-DAY ACCUMU- LATION AREAS (TAAs)	PCB TRANS- FORMERS	RFA SITES	OIL/WATER SEPARATOR SITES	OTHER
TOTAL	24	68	430	63	124	102	54	16
NFA	11	51	379	7	124	91	39	5
Further Action Required (includes LOCs with NFA Decision Documents in Review or In Development)	13	17	51	56	0	11	16	11

Exhibit 4 – New Sites Added during 2000 and Phantom Sites Deleted during 2000

Description	APHO SITES	UNDER- GROUND STORAGE TANKS	ABOVE- GROUND STORAGE TANKS	<90-DAY ACCUMU- LATION AREAS (TAAs)	RFA SITES	OIL/WATER SEPARATOR SITES
New Sites	0	1	7	0	0	0
Phantom Sites	0	3	0	2	0	2

Historical Environmental Program Highlights. The following accomplishments highlight the progress of environmental restoration activities at MCAS El Toro:

- Agency concurrence of a No Action Record of Decision (ROD) for eleven sites from OU-3 and OU-2A (Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, 22, and 25) in September 1997 and agency concurrence on the ROD for Site 11 in September 1999;
- Agency concurrence on the OU-2A interim ROD for the vadose zone at Site 24 in September 1997;
- Agency concurrence on the OU-2B interim ROD for Sites 2 and 17 in July 2000;
- Agency approval of the polynuclear aromatic hydrocarbon (PAH) Reference Study (prepared by Bechtel National Incorporated in 1996) that allowed the recategorization of 448 acres of land from area type 7 to area type 3, thus allowing this land to be transferable by deed; and
- Completion of two time-critical removal actions at Sites 2 and 17 and one non-time-critical removal action at Site 19.

Installation Restoration Program. Currently, a total of 24 sites are being investigated in the Installation Restoration Program (IRP) at the Station (Sites 1 through 22, 24, and 25). Of these, 22 sites were evaluated during the Phase I RI, which was completed in May 1993. Two additional sites were established for investigation in Phase II, bringing the total number of IRP sites to 24. These sites are grouped into three OUs: OU-1, OU-2, and OU-3. The following is a brief summary of the site groupings, current status, and FFA schedule for each of the three OUs.

- OU-1 addresses contaminated groundwater on- and off-Station and consists of one IRP site (**Site 18**). The final interim RI/FS report for OU-1 was submitted in August 1996. The Interim Draft Final Proposed Plan was submitted to the BCT in August 2000.
- OU-2 consists of three subunits (OU-2A, OU-2B, and OU-2C) and addresses potential source areas of groundwater contamination.
 - **OU-2A:** OU-2A includes Site 24 (the Volatile Organic Compound (VOC) Source Area) and Site 25 (the Major Drainages). **Site 24:** RI and Draft Phase II FS Reports for Site 24 were submitted in June and August 1996, respectively. Site 24 – the Volatile Organic Compound (VOC) Source Area – encompasses approximately 200 acres in the southwestern section of the Station. The planned reuse for Site 24 is cargo storage. The VOCs at Site 24 may have come from solvents containing trichloroethene (TCE) or perchloroethene (PCE) that were used at Site 24 until approximately 1975. Primary sources include degreaser tanks, storm drains and industrial waste sewers, and washracks. Pilot studies utilizing portable soil vapor extraction (SVE) treatment units were conducted during the period from approximately 1996 through 1998. The interim ROD (vadose zone only) for Site 24 was signed in September 1997, implementation of the final remedy – SVE treatment - commenced in 1999, and confirmation sampling of the vadose zone was completed in 2000. The ROD for OU-2A and OU-1, which will finalize the remedial decision and will address groundwater, is scheduled to be prepared in the year 2001. **Site 25:** The Draft Final ROD for no action was signed in 1997.
 - **OU-2B:** OU-2B addresses inactive landfill Site 2 (Magazine Road Landfill) and Site 17 (Communication Station Landfill). Sites 2 and 17 are located in the northeastern section of the Station in an area designated for future use as a habitat reserve. The former operational landfill units at Site 2 encompass approximately 27 acres, and the former operational landfill unit at Site 17 encompasses approximately 11 acres. Solid wastes from MCAS El Toro were disposed of at Sites 2 and 17. Suspected types of wastes include construction debris, municipal-type waste from Station operations, and oils and fuels. TCE and PCE have been detected in the groundwater at Site 2. The Draft Final Phase II RI and draft FS Reports were both submitted in September 1996. Draft Final FS reports were submitted in September 1997,

and a Draft Proposed Plan was submitted to the BCT in November 1997. The Draft Proposed Plan identified the preferred remedy for the former operational landfill areas at Sites 2 and 17 - a four-foot thick single-layer soil cover. The preferred alternative is based upon U. S. EPA's presumptive remedy approach to landfills. The Proposed Plan was provided for public review in May 1998. The Draft ROD was submitted in October 1998 to the BCT for review, and the Final Interim ROD was signed in July 2000. The Final ROD, a future document, will address management of the VOC plumes at Site 2.

- **OU-2C:** OU-2C addresses inactive landfill **Site 3 (Original Landfill)** and **Site 5 (Perimeter Road Landfill)**. Site 3 encompasses approximately 11 acres in the northeastern section of the Station. Site 5 encompasses approximately 1.8 acres in the southeastern section of the Station. Site 3 is designated for future reuse as a park, and Site 5 is designated for future reuse as a golf course. Reportedly, any waste generated on the Station could have been disposed of at these sites. The wastes are likely to have included municipal solid waste, fuels, and solvents. Site 3 included an incinerator, and incinerator ash was probably disposed of within the landfill. The Draft Final Phase II RI Reports were submitted in October 1996, and the Draft Final FS reports were submitted in September 1997. Based on BCT concurrence with the FS reports, a Draft Proposed Plan was submitted to the BCT in November 1997 and to the public in May 1998. The Proposed Plan identified the preferred remedy for the former operational landfill areas at Sites 3 and 5 - a four-foot thick single-layer soil cover. The preferred alternative is based upon U. S. EPA's presumptive remedy approach to landfills. Following the receipt of public comments, the preferred remedy was changed to a single-barrier cap with a two-foot foundation layer, a flexible membrane liner (FML), and a two-foot soil cover. The single-barrier cap design allows for future irrigation of the landfill cover. The Draft ROD was completed in March 1999, and the Draft Final ROD is expected to be completed in the year 2001.
- **OU-3** addresses the remaining sites and information pertaining to the suspected types of wastes at each OU-3 site is presented in Tables 2 and 3. Portions of three sites (**Sites 15, 19, and 20**) are no longer part of the IRP; they have been withdrawn via the CERCLA petroleum exclusion and are managed with state or local environmental program oversight. **Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, and 22** were addressed in the ROD for no action sites in 1997. **Site 1** is in the remedial investigation/feasibility study phase, and a draft Work Plan for the Phase II Remedial Investigation was completed in September 2000. A Proposed Plan recommending no action as the final remedy was issued for **Sites 7 and 14 (Operable Unit 3B)** in September 2000, a Public Meeting was held in October 2000, and the Draft ROD was completed in November 2000. A Draft Final ROD for **Sites 8 and 12** is in development. **Site 11** is in the remedial design/remedial action phase. A pilot study for multi-phase extraction was initiated at **Site 16** in October 2000,

and the results of the pilot study will be incorporated into the Draft Final Feasibility Study for Site 16.

RCRA Facility Assessment Sites. A RCRA Facility Assessment (RFA) was performed at the Station between 1990 and 1993. The RFA included the investigation of 305 solid waste management units (SWMUs)/areas of concern (AOCs). However, 3 units were located at MCAS Tustin, 15 units were duplicates of other SWMUs/AOCs, and 4 SWMUs/AOCs were researched and identified as phantom sites. Of the remaining 283 SWMUs/AOCs, 140 were included in a sampling effort. The RFA report was approved by DTSC contingent upon performance of additional investigation at 14 SWMUs/AOCs. A final addendum to the RFA report was completed on 31 May 1996. The addendum presents results and recommendations for the 14 SWMUs/AOCs and recommends closure strategies for 73 temporary accumulation areas. The status of SWMUs/AOCs, as presented in the RFA documentation, is summarized as follows:

- 8 addressed in the IRP;
- 1 addressed in the PCB category of LOCs;
- 76 addressed as USTs;
- 30 addressed as OWSs;
- 66 addressed as Temporary Accumulation Areas (TAAs); and
- 102 addressed as RFA sites, of which 14 required further action or assessment.

The number of SWMUs/AOCs (283) is greater than the number of RFA sites indicated in Exhibit 2, because some LOCs have been designated as both SWMUs/AOCs and as other types of LOCs. For example, there are USTs that have been identified as SWMUs/AOCs and there are TAAs that have been identified as SWMUs/AOCs. Exhibit 2 refers to these SWMUs/AOCs as USTs or TAAs instead of as RFA sites.

Compliance Program Sites and Other LOCs. There are several compliance programs in progress at MCAS El Toro that involve different types of LOCs including USTs, less-than-90-day accumulation areas, polychlorinated biphenyl (PCB)-containing transformers, and oil/water separators. The status of each of these types of LOCs is summarized as follows:

Status of USTs (Total: 398 sites):

- 353 No Further Action sites (88%);
- 45 sites with work in progress (11%).

Status of ASTs (Total: 32 sites):

- 26 No Further Action sites (81%);
- 6 sites with work in progress (19%).

Status of Aerial Photograph Anomaly (APHO) Sites (Total: 68 sites):

- 51 No Further Action sites (75%);
- 17 sites with work in progress (25%).

Status of Less-Than-90-Day Accumulation Areas and Resource Conservation and Recovery Act Facility Assessment (RFA) Solid Waste Management Units (165):

- 98 No Further Action sites (59%);
- 67 sites with work in progress (41%).

Status of PCB-Containing Transformers: 124 No Further Action sites (100%).

Status of Oil/Water Separators (Total: 54 sites):

- 39 No Further Action sites (72%); and
- 15 sites with work in progress (28%).

The status of the remaining types of LOCs (PCB storage sites, burn pits, silver recovery units, JP-5 pipeline, pesticide storage sites, and other sites) is shown on Exhibit 2. Business Plan updates will continue to summarize both the number and status of all LOCs at MCAS El Toro.

INITIATIVES FOR ACCELERATING CLEANUP

The BCT conducted a "bottom up" review of the environmental programs at MCAS El Toro in accordance with DoD guidance on establishing BCTs (DoD 1993). During the review process, the following nine issues were addressed to identify opportunities for accelerating cleanup activities necessary to facilitate conveyance of real property at the Station.

1. **Technology Review.** Publications such as Treatment Technologies Applications Matrix for Base Closure Activities, prepared by the California Base Closure Environmental Committee, dated November 1994 (CBCEC 1994a) and the latest information from the United States and California Environmental Protection Agencies (U.S. EPA and Cal-EPA) and DoD will be reviewed as part of the evaluations performed in selecting technologies.
2. **Removal Actions.** A UST Tiger Team addressed compliance and closure issues related to USTs on-Station during the 1995-1997 time period, and the Tiger Team worked to identify USTs that could be taken out of service without adversely impacting Station operations. All tanks within the former Tank Farms 1, 2, 3, 4, 5, and 6 have been removed, and most of the tank sites have been closed by the regulatory oversight agencies. Soil vapor extraction (SVE) technology was utilized to remediate the vadose zone at Tank Farm 2, and the vadose zone release was closed by the Regional Water Quality Control Board, Santa Ana Region in March 2000. SVE systems were utilized to remediate vadose zone releases of petroleum hydrocarbons at Former UST Sites 651-1, 651-2, 651-3, and 651-4 (UST Group 651) and at Former UST Site 364A during 2000, and a bioventing pilot test was initiated at Tank Farm 555 during 2000.

Two time-critical removal action memoranda were submitted for public review in

October 1996 for IRP Sites 2 and 17 (former landfills), for public safety and to abate erosion of landfill materials. The removal actions were completed in 1997. A non-time-critical action memorandum was also submitted for public review in October 1996 for IRP Site 19 (Unit 2). These removal actions were designed to reduce the risk to human health and the environment and to expedite cost-effective cleanup.

A pilot study utilizing multi-phase extraction for remediation of a combined petroleum hydrocarbon and chlorinated solvent release was initiated at Site 16 during October 2000.

3. **Clean Properties.** A basewide EBS for MCAS El Toro was submitted to the United States Environmental Protection Agency (U.S. EPA) and California Environmental Protection Agency (Cal-EPA) on 1 April 1995. The Navy, Marine Corps, and regulators have concurred on the designation of area type 1 parcels as Environmental Condition of Property, Category 1. The EBS designated approximately 3,088 acres of land as Environmental Condition of Property, Category 1. Review of information available since April 1995 indicates that approximately 3,175 acres of land are currently Environmental Condition of Property, Category 1. The BCT and the LRA will work together to determine how to transfer properties expeditiously.
4. **Overlapping Phases.** As an ongoing effort, the BCT will continue to identify phases of the cleanup process that can be overlapped to reduce the time required for completion. Areas of overlap at MCAS El Toro include the following:
 - the RFA was conducted concurrently with the Phase I RI during the period from 1991 through 1994;
 - Phase II RI/FS activities for the volatile organic compound (VOC) source area, landfills, and OU-3 sites were conducted simultaneously during the period from approximately 1995 through 1997;
 - Integration of Comprehensive Long-Term Environmental Action Navy (CLEAN)/Remedial Action (RAC) and other contractors to facilitate the design and implementation of field work has occurred and continues to occur during the remediation of the vadose zone and groundwater at Site 24; and
 - Planning for additional demonstration projects for groundwater remediation at Site 24 and other sites to facilitate site remediation during the development of the Records of Decision.
5. **Contracting Procedures.** SWDIV management of the CLEAN, RAC, and indefinite-quantity contracts has been based on a cooperative and interactive approach, and the following contractors have participated in environmental restoration and/or compliance program projects during 2000: ARINC; Bechtel National, Incorporated; CDM Federal Programs Corporation; Earth Tech; Foster

Wheeler; Geofon; Law-Crandall; The IT Group; and Roy F. Weston. Active participation by the Project Team results in a bias for action.

6. **Community Reuse Interface.** In an effort to carry out strategies for environmental restoration activities, while assuring proactive community involvement, the Station has adopted an approach to meet the needs of the public as well as the requirements of NEPA, CERCLA, CERFA, and the California Health and Safety Code Section 25356.1. The approach provides for a number of services to inform interested parties (e.g., the city of Irvine, the city of Lake Forest, and the County of Orange) of environmental restoration activities while maintaining a commitment for efficient and cost-effective cleanup at MCAS El Toro.
7. **Bias for Cleanup.** The BCT will continue to emphasize expedited remedial actions and attempt to avoid lengthy site characterization studies and prolonged RI/FS activities. As such, the BCT members will continue to collaborate in devising work plans, identifying cleanup criteria, and selecting remedial actions in an effort to aggressively pursue cleanup instead of studies and data collection. Acceleration of ongoing or future cleanup activities will continue to be in strict compliance with applicable rules, regulations, and public health and safety requirements. Remediation strategies and plans for cleanup activities have been shared with representatives from the known or anticipated reuse organizations including technical, operational, reuse, and administrative specialists.
8. **Presumptive Remedies.** Presumptive remedies are preferred technologies for common categories of sites, based on previous remedy selection and U.S. EPA scientific and engineering evaluation of performance data on technology implementation. The presumptive remedy approach is one tool used to accelerate cleanup under the Superfund Accelerated Cleanup Model. Presumptive remedies are expected to assure consistency in remedy selection and reduce time and cost required to clean up similar types of sites. Currently, presumptive remedies are recognized by U.S. EPA for VOC remedies and municipal and military landfill remedies. Presumptive remedies have been selected for the four landfill sites (Sites 2, 3, 5, and 17) and the VOC source area (Site 24).
9. **Partnering.** A partnering agreement among the Project Team is essential for efficient management of the base closure process. The following team charter agreement for MCAS El Toro was developed during a team-building seminar held in October 1994.

"We, the MCAS El Toro partners, commit to effectively working together to maximize restoration and reuse of MCAS El Toro by 1999. We will accomplish this goal through teamwork, dedicated and focused participation, our ethics outlined below, and effective communication between all partners.

We want the project to be enjoyable to work on and will work together with trust and respect, and will ensure that all team members' interests impact decisions. Problems will be resolved quickly or escalated if appropriate by team members closest to the issue. As partners, we commit to communicating our mission and partnership goals to new project members and encourage them to embrace this partnership.

Our mutually agreed upon ethical standards are listed below.

CODE OF ETHICS

Integrity	Objectivity	Trust	Dependability
Leadership	Accountability	Sincerity	Credibility
Empathy	Candor	Responsibility	Honesty

Additionally, we will listen to and value others' opinions, honor diversity, model the behavior we expect from others, and have fun."

Through meetings and conference calls, the BCT has worked together as a team to discuss and resolve issues related to environmental restoration activities at MCAS El Toro with a focus on expediting reuse while protecting human health and the environment.

SUMMARY OF CURRENT AND PLANNED BCT ACTION ITEMS

The BCT has coordinated and managed a number of tasks relating to the BRAC cleanup activities at MCAS El Toro during the past year. A brief list of accomplishments for 2000 includes:

Environmental Program Highlights for 2000.

- Conducted six (6) Restoration Advisory Board (RAB) meetings addressing a vast array of issues of public interest and one public meeting for Sites 7 and 14 during 2000;
- Continued progress on an agreement between Orange County and Irvine Ranch Water Districts and the United States (represented by the Department of Justice (DOJ)) in support of a multipurpose project to remediate regional groundwater contaminated with volatile organic compounds;
- Conducted CERCLA groundwater monitoring activities and investigated perchlorates and radionuclides in groundwater;
- Signed the draft Final Interim ROD for Sites 2 and 17;
- Completed Final Historical Radiological Assessment (HRA) and the Draft Final Survey Plan for the Radiological Survey;
- Completed the vadose zone confirmation sampling activities at Site 24;
- Commenced operation of Soil Vapor Extraction (SVE) treatment systems at UST Group 651 and former UST Site 364A;
- Constructed bioventing well and monitoring points for pilot test and began pilot test at Tank Farm 555;

- Achieved regulatory closure of 38 USTs (353 USTs to date) and removed 19 inactive USTs during calendar year 2000;
- Conducted removal of inactive OWSs and ASTs and conducted cleaning, testing, and closure of primary JP-5 pipelines; and
- Conducted site verification sampling activities at UST sites, AST sites, OWS sites, and aerial photograph anomaly (APHO) sites, and completed closure documentation for more than 50 LOCs.

Planned Goals for Year 2001:

- Sign the agreement between Orange County and Irvine Ranch Water District and the DOJ in support of a multipurpose project to remediate regional groundwater contaminated with volatile organic compounds;
- Issue the Proposed Plan for Sites 18 and 24 for public comment;
- Issue the Draft ROD for Sites 18 and 24 for public comment;
- Issue the Proposed Plan for Site 16 for public comment;
- Issue the Draft ROD for Site 16 for public comment;
- Complete Draft Final RODs for Sites 3 and 5;
- Conduct radiological surveys;
- Initiate soil sampling activities for lead-based paint at the housing areas;
- Continue coordination with United States Fish and Wildlife Service, the LRA, and the BCT during the design of landfill covers for Sites 2 and 17;
- Procure services for the design of landfill covers for Sites 3 and 5;
- Continue groundwater monitoring activities and evaluation of groundwater data; and
- Conduct the site verification and/or remediation activities at UST, OWS, AST, fuel pipeline, and APHO sites.

Table 1 provides a list of recommendations and issues associated with the environmental restoration and compliance programs that require further evaluation and action by the BCT. The list covers key items identified during the course of the Business Plan preparation and includes the BCT activities relating to the base closure.

Tables 2 and 3 identify the status of each LOC as of 31 December 2000, and Table 4 identifies the buildings with known asbestos. The current reuse parcel identifier, for the Concept B Reuse Plan of 1999, is included for each LOC in Tables 2 and 3. Figures 1, 2, and 3 show the vicinity of the Station and information pertaining to the most current reuse plan (preferred land use plan (Concept B)). Figures 4 through 12 show each type of LOC, Figures 13 and 14 show the environmental condition of property, and Figure 15 shows the IRP Site boundaries with the preferred land use plan, and Figure 16 shows the radiological survey sites.

SCHEDULE/CRITICAL MILESTONES

The Installation Restoration Program milestones are identified in the Federal Facilities Agreement (FFA) for the Marine Corps Air Station, El Toro. The FFA schedule is usually revised or updated three or more times per year.

Critical milestones for the environmental restoration program are presented in Table 5. Historical information pertaining to the expenditures for each Installation Restoration Program Site and cost to complete estimates are presented in Table 6.

INTRODUCTION SECTION

NOTE: The Introduction Section serves as an "Executive Summary" of the complete document. To look at tables, figures and attachments referenced in the Introduction, please consult the complete document. It is available at two locations: (1) the Administrative Record File, located at MCAS El Toro, Base Realignment and Closure Office, Building 368 – contact Ms. Charly Wiemart at (949) 726-2840 to arrange an appointment; (2) the MCAS El Toro Information Repository located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, phone number (949) 551-7151.



Environmental Compliance Program Documentation Update (24 January 2002)

Underground Storage Tank (UST) Sites, Resource Conservation and Recovery Act Facility
Assessment (RFA) Sites, and other Locations of Concern
Former Marine Corps Air Station, El Toro

Regulatory Submittals

Site Identification	Date of Submittal	Title of Submittal and Lead Regulatory Oversight Agency
RFA Sites	24 January 2002	RFA work plan addendum - DTSC
TAA 31A	20 December 2001	Closure Report - DTSC
UST Group 651	19 December 2001	Status Report - RWQCB
Tank Farm 555	19 December 2001	Work Plan - RWQCB
Tank 398 Site and other UST Sites	28 November 2001	Technical Memorandum - Groundwater data summary
TAA 7	19 November 2001	Summary Report - DTSC
Site 07GN1	16 November 2001	Summary Report - RWQCB
TAA 651B	30 October 2001	Summary Report - DTSC
Tank Farm 555	19 October 2001	Technical Memorandum, Bioventing Pilot Test Report, Tank Farm 555 - RWQCB
TAA 651A	15 October 2001	Summary Report - DTSC
Bomb Assembly Area	9 October 2001	Technical Memorandum (information submittal) - DTSC
RFA Sites	10 September 2001	Responses to DTSC Comments dated 3 and 10 July 2001 on the Addendum to the Supplemental Work Plan - DTSC
UST Group 651	4 September 2001	UST Group 651 Groundwater Aquifer Pumping Test - RWQCB
Jet Fuel Pipelines, MSC JP5, Units 4, 5, 6, 7, and 8	29 August 2001	Testing and Physical Closure Procedures - RWQCB
Tank Farm 555	27 August 2001	Bioventing Pilot Test - RWQCB
UST 1B, UST 98A, and USTs 390A&B	24 August 2001	SVE Testing Activities - RWQCB
TAA 626	15 August 2001	Summary Report - DTSC
APHO 38	7 August 2001	Responses to DTSC Comments
AST 315	30 July 2001	Summary Report - RWQCB
AST 314	27 July 2001	Technical Memorandum - RWQCB
SRU 3B	16 July 2001	Summary Report - DTSC
UST Group 651 and Former Tank Farm 555	2 July 2001	Routine Status Report - RWQCB

Recent Regulatory No Further Action (NFA) Determinations

Site Identification	Date of NFA Determination	Oversight Agency or Agencies
Bomb Assembly Area	2 November 2001	DTSC letter dated 2 November 2001
MSC B1	11 October 2001	RWQCB letter dated 11 October 2001
Anomaly Area 5	11 October 2001	RWQCB letter dated 11 October 2001



DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, D. C. 20350-2000

IN REPLY REFER TO

5090
Ser N453D/1U595697
NOV 29 2001

From: Chief of Naval Operations

To: Distribution

Subj: POLICY FOR CONDUCTING COMPREHENSIVE ENVIRONMENTAL
RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)
STATUTORY FIVE-YEAR REVIEWS, NOVEMBER 2001

Ref: (a) Navy/Marine Corps Installation Restoration Manual
(Feb 97)

Encl: (1) Navy/Marine Corps Policy for Conducting Comprehensive
Environmental Response, Compensation, and Liability
Act (CERCLA) Statutory Five-year Reviews, November,
2001

1. Enclosure (1) establishes procedures for conducting five-year reviews, facilitates consistency of five-year reviews across the Navy/Marine Corps, clarifies current policy, and delineates roles and responsibilities of various entities in conducting or supporting five-year reviews.


2. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires that remedial actions resulting in any hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure be reviewed every five years to assure protection of human health and the environment, regardless of the National Priorities List (NPL) status of the site or installation.

3. This policy has been coordinated and concurred with by the Marine Corps.

4. This policy will be included in the next revision to reference (a). It will also be available on the N45 website (<http://web.dandp.com/n45/index.html>) under Environmental Restoration/Training, References.

Subj: POLICY FOR CONDUCTING COMPREHENSIVE ENVIRONMENTAL
RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)
STATUTORY FIVE-YEAR REVIEWS

5. Questions or comments concerning this policy should be
directed to Mr. Geoffrey D. Cullison, CNO N453D, 2211 So. Clark
St., Arlington, VA 22202-3735, (703) 602-5329 (DSN 332-5329),
cullison.geoffrey@hq.navy.mil.


R. T. Nolan
By direction

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**Navy/Marine Corps Policy for
Conducting Comprehensive Environmental Response, Compensation,
and Liability Act (CERCLA) Statutory Five-year Reviews
November 2001**

Ref: EPA Comprehensive Five-Year Review Guidance, June 2001, EPA 540-R-01-007,
OSWER No. 9355.7-03B-P, §1.3.1

1. Statutory requirements:

a. The statutory requirement for five-year review was added to CERCLA as part of the Superfund Amendments and Reauthorization Act of 1986 (SARA). A five-year review is required when **both** of the following conditions are met, whether the site is on the National Priorities List (NPL) or not:

1) Upon completion of the remedial actions at a site, hazardous substances, pollutants, or contaminants will remain above levels that allow for unlimited use and unrestricted exposure. For example, if a site is restricted to industrial use because hazardous substances, pollutants, or contaminants remain above levels that allow for unlimited use and unrestricted exposure, five-year reviews must be conducted.

2) The Record of Decision (ROD) or Decision Document (DD) for the site was signed on or after October 17, 1986 (the effective date of SARA).

b. CERCLA §121(c), as amended, states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five-years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

c. The National Contingency Plan (NCP), 42 U.S.C. § 9621(c), implementing regulations, 40 C.F.R. Part 300.430(f)(4)(ii), provide:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action.

d. Consistent with Executive Order 12580, the Secretary of Defense is responsible for ensuring that five-year reviews are conducted at all qualifying Department of Defense (DoD) cleanup sites.

e ... EPA classifies five-year review as either "statutory" or "policy" depending on whether it is required by statute or conducted as a matter of EPA policy. In particular, EPA views five-year reviews conducted of RODS issued before October 17, 1986 as being conducted as a matter of policy because the five-year review requirement didn't become law until that date. Statutory five-year reviews are required by law and will be conducted by the Navy/Marine Corps at any site meeting the requirements of the law. We generally do not conduct policy five-year reviews.

2. Definitions:

a. For purpose of this policy, "site" means a location on an installation's property where a hazardous substance has been deposited, stored, disposed, or placed, or has otherwise come to be located where, upon completion of the remedial action, hazardous substances, pollutants, or contaminants will remain at the site above levels that allow for unlimited use and unrestricted exposure. This includes areas off the installation where contamination may have migrated. For purpose of this policy, "site" also means Operable Unit.

b. "Unlimited use" and "unrestricted exposure" mean that there are no restrictions on the potential use of land or other natural resources.

3. Purpose of a five-year review:

a. The purpose of a five-year review is not to reconsider decisions made during the selection of the remedy, as specified in the ROD, but to evaluate the implementation and performance of the selected remedy.

b. Where a site has a remedial action that is still in the Remedial Action-Construction (RA-C) phase or the Remedial Action-Operations (RA-O) phase, a five-year review should confirm that immediate threats have been addressed and that the remedy will be protective when complete.

c. Where a site is in the Long Term Management (LTMgt) phase, the five-year review should confirm whether the selected remedy remains protective.

d. When the five-year review indicates that the remedy is not performing as designed, the report should recommend actions to improve performance.

4. NPL status: The continuing presence of hazardous substances, pollutants, or contaminants above levels that allow for unlimited use and unrestricted exposure under CERCLA establishes the requirement for a five-year review, not the NPL status of the installation. Reference (a) states that EPA will delete an installation from the NPL when deletion criteria have been satisfied and that an installation will not be kept on the NPL solely because it is subject to five-year reviews. If the installation has been deleted or is in the process of being deleted, the five-year review report should address the status of any deletion action.

5. Resource Conservation and Recovery Act (RCRA) response: Five-year reviews are not required if cleanup of a site is addressed under RCRA corrective action. In cases where both RCRA and CERCLA authorities are used to address different sites on an installation, a five-year review is only required for those portions of the installation being addressed under CERCLA that meet the criteria for five-year reviews. When a RCRA action is included as a portion of a ROD or DD or other CERCLA decision document, the RCRA action should be included in the five-year review.

6. Interim remedial action: By itself, an interim remedial action at a site does not start the clock for a five year review of that site; it is treated like any other remedial action for the purpose of five-year reviews. An interim remedial action triggers the five-year review clock if it meets any of the criteria outlined in paragraph 1. above. For instance, if an alternate water supply is installed but hazardous substances, pollutants, or contaminants remain onsite above levels that allow for unlimited use and unrestricted exposure, a review is required by statute. A subsequent action may then reduce the hazardous substances, pollutants, or contaminants to levels allowing unlimited use and unrestricted exposure. Remedial actions are those actions consistent with a permanent remedy taken instead of, or in addition to, removal action.

7. Five-year review "trigger":

a. In keeping with the requirements of CERCLA §121(c) and the NCP, initiation of the selected remedial action that will result in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure after the remedial action is complete is the "trigger" that starts the five-year review clock. For most Navy/Marine Corps sites, this "trigger" is the onsite mobilization for commencement of the RA-C phase.

b. The first site on an installation that triggers the five-year review clock triggers the five year review clock for the entire installation, or that portion of the installation addressed under the ROD or DD.

c. Where the selected remedy will result in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure but will not require a RA-C phase, such as monitored natural attenuation using existing wells and/or institutional controls, the remedy start date is the ROD or DD signature date and therefore is also the trigger for the five-year review clock.

8. Five-year review due dates:

a. The five-year review report for a site is to be completed and signed within five years of the trigger date for that site. Subsequent five-year reviews should be signed no later than five-years after the signature date of the previous five-year review reports.

b. Because the regulators do not have a statutory role in the conduct of five-year reviews, it will be up to Navy/Marine Corps to enforce the five-year review dates. To assist the field in tracking five-year review dates, there is a field in NORM that allows management to track these dates.

9. Results of a five-year review: The results of the five-year review are presented in a five-year review report.

a. The five-year review report should;

1) clearly state whether the remedy is or is expected to be protective,

2) document any deficiencies identified during the review, and

3) recommend specific actions to ensure that a remedy will be or will continue to be protective.

b. Where necessary, five-year review reports should include descriptions of follow-up actions needed to achieve, or to continue to ensure, protectiveness. Along with these recommendations, the report should list a timetable for performing the actions and the parties responsible for implementation.

c. If it is determined that cleanup levels or remedial action objectives cannot be achieved through the remedial action, the recommendations may suggest the type of decision process (e.g., ROD or DD, ROD or DD Amendment, Explanation of Significant Differences (ESD)) needed to evaluate or make changes to the remedy, cleanup levels, or remedial action objectives.

d. For sites that are still in the RA-O phase (pre-Response complete) where evaluation and optimization of the remedial action operations are performed routinely, most information for the five-year review should be readily available.

10. Review and Signature: Pursuant to the delegations of authority in sections 2(d) and 11(g) of Executive Order 12580, and DoD Instruction 4715.7 of 22 April, 1996, Department of the Navy (DON) is the approval authority for CERCLA five-year reviews conducted at sites under its jurisdiction, custody or control.

a. Five-year reviews completed with ER,N or BRAC funds will be signed by the Commanding Officer of the supporting EFD/A.

b. Five-year reviews completed with installation funds will be signed by the installation Commanding Officer/Commanding General or a designee of the Regional Environmental Coordinator.

c. Regulatory agencies have no statutory review authority in five-year reviews conducted by DON in its Lead Agent authority except where some past DON Federal Facility Agreements (FFAs) have included five-year review reports as enforceable primary documents. Future FFAs and Federal Facility-State Remediation Agreements (FFSRAs) are not to include five-year review reports as either primary or secondary documents. However, five-year reviews may be submitted to the appropriate regulators for their review and comment as a matter of partnering.

11. Keeping the community informed:

a. Because the five-year review addresses the status and protectiveness of a remedy, it should be used to communicate this information to the community. If the Restoration Advisory Board (RAB) is still active at the installation, preparation for and conduct of the five-year review should be an agenda item at each RAB meeting conducted while the five-year review is underway. Where necessary, additional RAB meetings should be held to ensure the community is kept up to date on progress and results of the five-year review. If the RAB is inactive or has disbanded, the installation shall determine the most effective approach to informing the community based on the level of community interest. At a minimum, community involvement activities during the five-year review should include notifying the community that the five-year review will be conducted, notifying the community that the five-year review has been completed, and providing the results of the review to the local site repository.

b. The installation Public Affairs Officer can recommend appropriate methods of communication (e.g., public notices, fact sheets) for notifying the public.

c. Upon completion of the five-year review and Five-Year Review Report, a brief summary of the report should be made available to the stakeholders. The summary should include a short description of the remedial action, any deficiencies, recommendations and follow-up actions that are directly related to protectiveness of the remedy, and the determination(s) of whether the remedy is or is expected to be protective of human health and the environment. The summary should also provide the location of the site information repository and/or where a copy of the complete report can be obtained, and provide the date of the next five-year review or notify the community when five-year reviews will no longer be necessary.

e. Five year reviews are not Administrative Record material and are not to be included therein. However, the RPM should ensure that the signed five-year review report is placed in the site information repository.

12. Discontinuing five-year reviews:

a. There is no statutory provision for the discontinuation of statutory reviews. However, EPA acknowledges in reference (a) that five-year reviews may no longer be needed when no hazardous substances, pollutants, or contaminants remain on site above levels that allow for unlimited use and unrestricted exposure, reference (a), paragraph 1.2.4. The basis for this finding should be documented in the final Five-Year Review report.

b. If a ROD or DD states that a five-year review will be performed, but prior to conducting the first review the EFD/EFA determines that no review is required, this finding should be recorded in a major document subject to public comment, such as a Proposed Plan or a Notice of Intent to Delete.



DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132-5190

5090
Ser 06CC.DG/976
November 29, 2000

Mr. Peter Hersh
Assistant to the City Manager
City of Irvine
One Civic Center Plaza
P.O. Box 19575
Irvine, CA 92623-9575

Subj: LAND-USE CONTROLS AT MARINE CORPS AIR STATION (MCAS) EL TORO

Dear Mr. Hersh,

This letter represents the Department of the Navy's (DON's) response to questions raised by the city of Irvine concerning land-use controls at the former Marine Corps Air Station (MCAS) El Toro. The questions were transmitted in a 20 April 2000 letter from you to Mr. Gould (SWDIV), Mr. Kistner (U.S. EPA), Ms. Chesney (Cal-EPA DTSC), and Ms. Hannon (Cal-EPA RWQCB). The letter requested a presentation be made at the next Restoration Advisory Board meeting on the nature and extent of land-use controls to be imposed on the reuse of the former base. Such a presentation was made prior to your letter, on 29 March 2000. This letter supplements that presentation and specifically addresses land-use controls for Installation Restoration Program (IRP) sites being evaluated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. Land-use controls for Resource Conservation and Recovery Act areas of concern, above- and underground storage tanks, and reuse parcels will be addressed in the Finding of Suitability for Transfer (FOST) documents for their respective parcels.

Upon reviewing the city's request, the DON determined that it would be most effective to respond to the city's questions with a comprehensive overview discussion of the land-use restriction issues raised rather than format the response in a point-by-point "Response to Interrogatories" format. In the course of that discussion, all of the specific questions will be addressed.

The DON concurs with the general definition of land-use controls set forth in the city's letter; that is, any restrictions placed upon the use of the land, including, but not limited to, easements, covenants, licenses, institutional controls, ordinances, memoranda of understanding (MOUs), and any other method by which one or more parties may limit the use of parcels at the former base. The DON will be making limited use of such land-use controls at some of the IRP sites at the former MCAS El Toro, although these land-use controls are expected to be necessary on only 7 IRP sites (Sites 2, 3, 5, 16, 17, 18, and 24) out of a total of 24 IRP sites at the former base and on only 5 sites (Sites 2, 3, 5, 16, and 24) that will be conveyed outside federal ownership (Enclosure 1). IRP Site 1 is currently undergoing remedial investigation and will not be addressed in this document because it is not known whether the site will require land-use controls. The approach to IRP Sites 8, 11, and 12 is currently in discussion with the BCT.

To place the issue of land-use controls in perspective, as documented in the Base Realignment and Closure Business Plan for MCAS El Toro (March 2000), 85 percent of the Station property is environmentally suitable for transfer by deed without remediation or land-use restrictions. Most of the remaining 15 percent of the Station consists of areas with subsurface groundwater contamination. Land-use restrictions for such groundwater contamination will be limited to prohibitions on the extraction or use of groundwater and limited surface controls to protect monitoring and remediation equipment.

A. Categories of Land-Use Restrictions

The land-use controls will include land-use restrictions that fall within the following categories.

1. Prohibition upon the following future uses of hazardous waste property in the absence of a variance as required by state law (Health and Safety Code Section 25232(b)(1)(A)): residences, hospitals for humans, schools for persons under 21 years of age, day care centers, and permanently occupied human habitation other than those used for industrial purposes. (These restrictions apply to landfill Sites 2 and 17; they are also expected to apply to landfill Sites 3 and 5.)

2. Restrictions on construction upon or excavations into contaminated soils and waste disposal sites in order to protect human health and the integrity of the remedial action. (This includes the area containing landfill wastes at Sites 2, 3, 5, and 17.)

3. Restrictions upon the extraction and/or use of contaminated groundwater exceeding drinking water standards without prior approval. (These restrictions are expected to apply at Sites 2, 16, 18, and 24.)

4. Restrictions upon damaging or interfering with the operations of remediation or monitoring facilities and associated equipment. (Groundwater extraction and remediation equipment is expected to be located at Sites 16, 18, and 24; monitoring wells will be located as needed throughout the Station.)

B. Types of Land-Use Control Legal Mechanisms

The type of land-use control legal mechanism employed by the DON depends, in part, upon whether the property in question is planned for a transfer by deed to the Local Redevelopment Authority (LRA) or for a transfer to another federal department or agency. Another factor affecting the choice of legal mechanism is whether the contamination is located inside or outside the boundaries of the former base.

1. Land-use restrictions addressing property that will be transferred to the LRA by deed will primarily be implemented through environmental restrictive covenants incorporated into deeds of transfer as provided by California Civil Code Section 1471. These covenants in the deed will be enforceable by the DON. In addition, the DON has agreed to enter into good faith negotiations with the Department of Toxic Substances Control (DTSC) to execute Environmental Restriction Covenants and Agreements pursuant to

California Health and Safety Code Chapters 6.5 and 6.8 and California Civil Code Section 1471. If agreed upon, these Environmental Restriction Covenants and Agreements will incorporate identical land-use restrictions to those in the parallel deeds. The covenants and agreements will give DTSC the authority to enforce these identical restrictions.

2. The DON will rely upon MOUs between the DON and the recipient federal agency as the legal mechanism for implementing land-use controls in transfers from the DON to another federal agency or department.

3. The DON must also select land-use control legal mechanisms to address certain groundwater contamination exceeding drinking water standards that originated within the boundaries of former MCAS El Toro and now underlies adjacent properties owned by other persons. Restrictive covenants in transfer deeds are not available as a mechanism in this situation because the DON does not and has not owned the relevant property. The DON is considering relying upon enforcement of local regulations and ordinance(s) by local units of government in order to regulate the extraction and use of such off-Station contaminated groundwater. This potential land-use control mechanism is still undergoing evaluation.

C. Enforcement and Removal of Land-Use Controls

Land-use restrictions in the deed will be enforced by the DON and by the regulatory agencies that are identified as covenantees. If the DON and DTSC agree upon land-use restrictions in the Environmental Restriction Covenant and Agreement, they will be enforced by DTSC and any cocovenantees identified in such a document. The deeds and Environmental Restriction Covenants and Agreements will contain clauses providing for termination of these restrictions and removal from the legal documents once remediation is complete and/or it can be demonstrated that they are no longer necessary to protect human health and the environment. In addition, Health and Safety Code Section 25234 applies to the removal of land-use restrictions imposed through any Environmental Restriction Covenant and Agreement between the DON and DTSC. Example language for the imposition and removal of environmental covenants, conditions, and restrictions follows. The language is taken from the Naval Air Station Alameda East Housing Deed executed by and between the DON and the Alameda Reuse and Development Authority in June 2000.

The following environmental covenants, conditions, and restrictions (hereinafter "environmental restrictions") regarding the use of the Property have been determined by the GRANTOR in this Covenant to be reasonably necessary to protect present or future human health or safety or the environment as provided by CERCLA and California Civil Code Section 1471. The environmental restrictions made and accepted herein by GRANTEE shall be for the benefit of and enforceable by the GRANTOR herein as provided under Civil Code Section 1471 and applicable Federal statutes and regulations, shall run with the land, and shall be binding on the GRANTEE, its successor and assigns.

These environmental restrictions may be released at such time as the GRANTOR has obtained written confirmation from California

Department of Toxic Substances Control ("DTSC") that the appropriate regulatory agency has determined that the restricted Property is protective of present or future health or safety of the environment for that use that was formerly prohibited. Upon receipt of such written confirmation, the GRANTOR shall deliver to the GRANTEE in recordable form, a release (the "Release") relating specifically to the environmental use restrictions set forth in this deed. The execution of the Release by the GRANTOR shall remove all notices and restrictions relating to the remedy addressed by the restrictions from the title to the Property.

D. Land-Use Controls at Specific IRP Sites

1. Overview

IRP sites that have been addressed in CERCLA Records of Decision (RODs) to date include Sites 2, 4, 6, 9, 10, 11, 13, 15, 17, 19, 20, 21, 22, 24, and 25. IRP sites that have been addressed in Proposed Plans but have not reached the draft final ROD stage include Sites 3, 5, 7, 8, 12, and 14. IRP Sites 1, 16, and 18 are currently being addressed in the CERCLA process and have not yet progressed to the point of having been addressed in a published Proposed Plan. As mentioned previously, IRP Site 1 is currently in the remedial investigation phase. Therefore, it is not known whether any remedial action is necessary at IRP Site 1. IRP Sites 16 and 18 are expected to require land-use controls as discussed below.

Land-use controls are part of the selected remedy for IRP Sites 2 and 17. These sites consist of inactive landfills that will be remediated by capping the landfills with the waste left in place and monitored. Capping and land-use controls have also been proposed for landfill Sites 3 and 5. Land-use controls will be used at all four landfill sites to protect public health and the environment as well as to maintain the integrity of the remedial action at the sites. IRP Sites 2, 16, 18, and 24 are sites where concentrations of volatile organic compounds (VOCs) in groundwater exceed drinking water standards. Land-use controls will be necessary at these sites to prevent extraction or use of the contaminated groundwater without prior approval, to protect the integrity of the remedial action (e.g., protect extraction and treatment equipment and monitoring wells), and to allow access to the site for equipment operation, maintenance, and monitoring.

IRP Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, 22, and 25 were evaluated and found to require no action. This decision is documented in a signed ROD for these sites. Sites 7 and 14 also have been recommended for no action in a Proposed Plan. Sites 8, 11, and 12 contain shallow soil contamination. Soil excavation and off-Station disposal have been proposed. Under such a proposed remedial action, no institutional controls would be expected at Sites 8, 11, or 12. The final approach to these sites is currently in discussion amongst the BCT.

2. Land-Use Restrictions for Waste Disposal Sites

The only sites where the DON plans to transfer property containing wastes in soil that necessitate land-use controls are the landfill Sites 2, 3, 5, and 17. Land-use controls have been selected in an Interim ROD for Sites 2 and 17 and are proposed for Sites 3 and 5 to restrict construction upon and excavation into the landfills and thus prevent exposure to buried waste and protect the integrity of the landfill remedy. See the attached excerpt from the Interim ROD for Operable Unit-2B for a typical example of institutional control provisions for inactive and closed landfills on nonfederal land (Enclosure 2).

Site 17 is expected to be transferred to a federal entity. Sites 3 and 5 and portions of Site 2 are anticipated to be transferred by deed to the LRA. Land-use restrictions addressing construction upon and excavation into the landfills at Sites 2, 3, and 5 will be included in restrictive covenants in the deed as well as in an Environmental Restriction Covenant and Agreement between DTSC and the DON, if agreed upon. In accordance with regulatory requirements, an appropriate buffer zone may be applied beyond the actual limits of the waste. DON and regulatory agency approval would be required prior to development of property within this zone. The purpose of applying the buffer zone is to ensure that the impacts of potential landfill gas migration from the landfill and runoff onto the landfill are properly evaluated prior to construction and that public health and the environment are adequately protected.

The DON currently plans to transfer most of the property containing Sites 2 and 17 to the Federal Aviation Administration (FAA) by means of a federal agency-to-agency transfer. Restrictions would be imposed on that property through an MOU between the DON and the FAA. However, land adjacent to Site 2 is planned to be transferred to the LRA for use for the Alton Parkway Extension. Land-use controls for the purposes of preventing erosion of the landfill cap and groundwater management would be established for this portion of the property using restrictive covenants in the deed of transfer to the LRA and an Environmental Restriction Covenant and Agreement between DTSC and the DON, if agreed upon. The land-use provisions from the ROD for Site 2 are reproduced in Enclosure 2.

3. Land-Use Restrictions for Property Overlying Contaminated Groundwater

Groundwater at Sites 2, 16, 18, and 24 is contaminated by VOCs at concentrations that exceed drinking water standards. Therefore, it is likely that land-use restrictions will be necessary at these sites to prevent extraction and/or use of this groundwater without prior approval until remediation is complete as described below.

Institutional controls are planned for IRP Site 2 to prevent exposure to or use of groundwater containing VOCs at concentrations above drinking water standards; prevent damage to monitoring equipment and associated pipelines and appurtenances; and ensure that the DON and regulatory agencies have the right to enter the property to perform monitoring and remedial activities. Such land-use restrictions would be included in the MOU between the DON and

the FAA for the federal agency-to-agency transfer of the property. These land-use restrictions will be included in restrictive covenants in the transfer deed as well as in an Environmental Restriction Covenant and Agreement between DTSC and the DON, if agreed upon, for the land adjacent to Site 2 whose transfer to the LRA is planned for use for the Alton Parkway Extension. Please see Enclosure 2 for a copy of the land-use restrictions from the ROD for Site 2.

Excavation into soil above contaminated groundwater at Site 2 would be prohibited without the prior approval of the DON and the regulatory agencies. Groundwater is very close to the surface at this site. Part of the approval process would be to ensure that dewatering is performed safely and in accordance with appropriate regulations.

IRP Sites 16 and 24 are located within the boundaries of the former MCAS El Toro in parcels that are expected to be transferred by deed from the DON to the LRA. Restrictive covenants in the deed of transfer to the LRA and an Environmental Restriction Covenant and Agreement between DTSC and the DON will be used to prevent extraction and/or use of groundwater without prior approval, prevent damage to remediation and monitoring equipment, and allow access by the DON and the regulatory agencies to operate and maintain the extraction and treatment equipment and collect samples from the monitoring wells.

Site 18 consists of a plume of VOC-contaminated groundwater that extends from Site 24 beyond the western boundary of the Station approximately 3 miles off-Station to the west beneath the city of Irvine. The United States is currently negotiating with the Orange County Water District and Irvine Ranch Water District regarding an agreement to construct and operate a joint treatment facility commonly called the "Irvine Desalter Project." The facility would be used to remediate contaminated groundwater at Site 18. As noted above, the DON is still evaluating the possibility of relying upon local regulations or ordinances to regulate the extraction and use of contaminated groundwater that exceeds drinking water standards during the time that groundwater remediation is underway. These regulations or ordinances would not restrict surface use of property above the plume.

Deeper soil at Sites 16 and 24 was reported to contain concentrations of VOCs that were high enough to contaminate groundwater above drinking water standards. To reduce the concentrations of VOCs in soil, the interim ROD for the vadose zone at Site 24 selected soil vapor extraction as the cleanup remedy. A similar remedy is expected to be selected for cleanup of soil at Site 16.

Remediation of contaminated soil at Sites 16 and 24 may not be completed prior to property transfer. If soil cleanup is still being performed at the time of property transfer, deed restrictions will be used to protect the wells and equipment and provide access to operate the system. During remediation, deep excavation would be prohibited without prior approval of the DON and regulatory agencies. Land-use controls are not anticipated to be required once remediation is complete.

November 29, 2000

E. Notifications

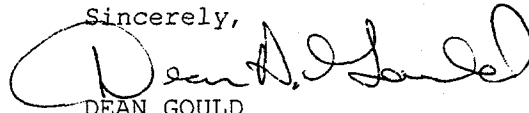
Notification requirements for structures containing asbestos or lead-based paint will be addressed in the FOST documents and in the deeds for the parcels containing the asbestos or lead-based paint in accordance with applicable Department of Defense guidance. Chlorofluorocarbon- and polychlorinated biphenyl-containing equipment will also be evaluated in these transfer documents. In addition, the deed will contain a hazardous substances notification, identifying hazardous substances that were stored for 1 year or more, known to have been released, or disposed on the property.

F. Tracking of Land-Use Controls

The DON is currently evaluating the need for and policy concerning central tracking system for land-use controls for closed installations around the nation. The land-use controls at the former MCAS El Toro installation will be tracked in accordance with the final policy adopted by DON on this issue.

We believe that this response addresses the concerns raised in your letter, keeping in mind that policy is still under development and the final approach to a number of sites is yet to be determined. If you have any further questions, please feel free to contact Ms. Content Arnold, Lead Remedial Project Manager for MCAS El Toro, at (619) 532-0790 or myself, at (619) 532-0784.

Sincerely,



DEAN GOULD

BRAC Environmental Coordinator
MCAS El Toro

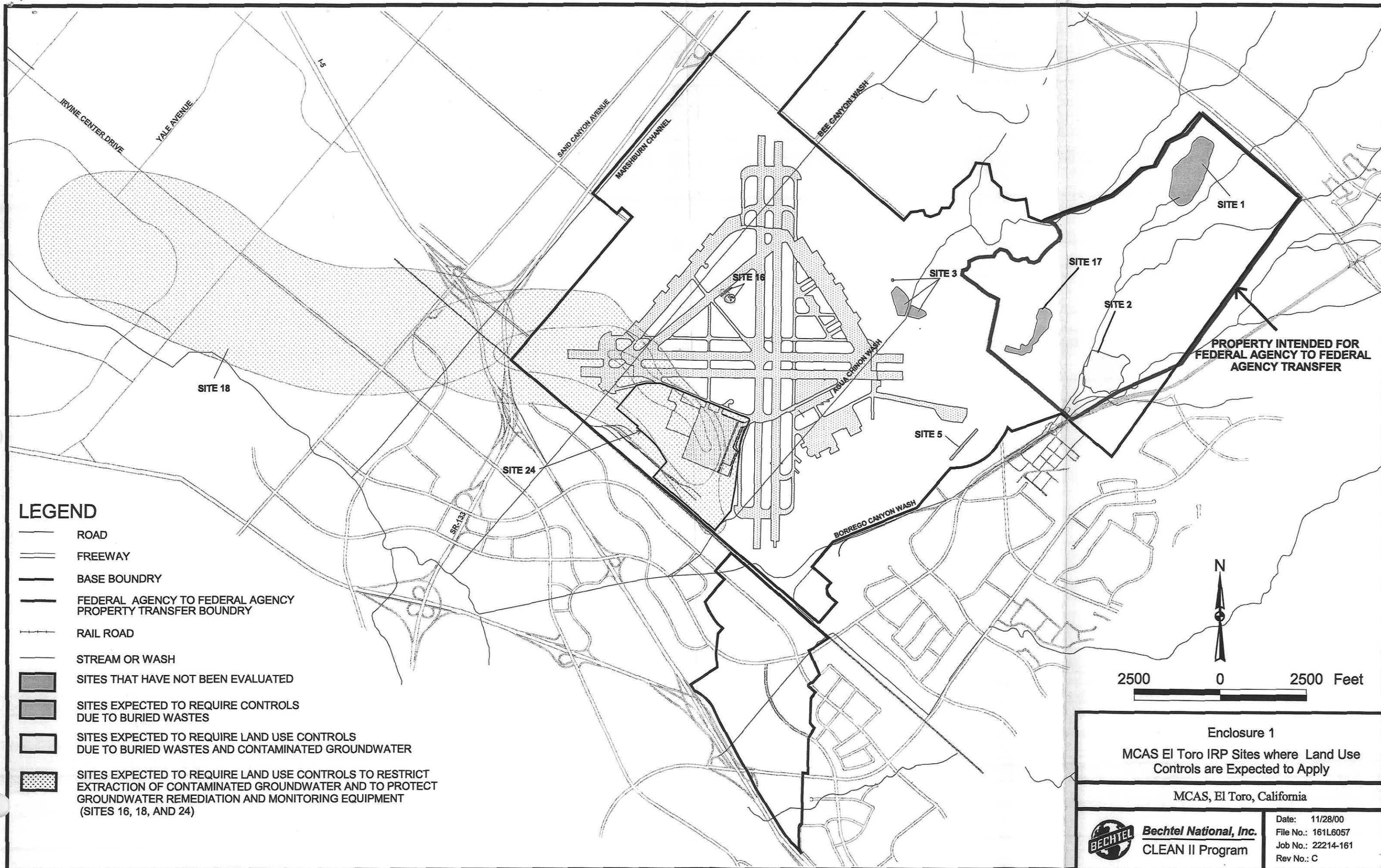
By direction of the Commander

Enclosures:

- (1) Currently anticipated land-use controls at MCAS El Toro
- (2) Interim ROD for Operable Unit-2B excerpt

Copy to:

Mr. Glenn Kistner, U.S. EPA
Ms. Triss Chesney, DTSC
Mr. John Broderick, RWQCB
Mr. Greg Hurley, RAB Community Co-Chair
Ms. Polin Modanlou, El Toro Master Development Program



Enclosure 1

MCAS El Toro IRP Sites where Land Use Controls are Expected to Apply

MCAS, El Toro, California

BECHTEL Bechtel National, Inc.
CLEAN II Program

Date: 11/28/00
File No.: 161L6057
Job No.: 22214-161
Rev No.: C

Enclosure 2

Example of Institutional Controls Provisions for Inactive and Closed Landfills

9.2 INSTITUTIONAL CONTROLS

Institutional controls are required to maintain the integrity of the caps by preventing excavations; minimizing infiltration of surface waters; preventing land use that presents unacceptable risk to human health and the environment due to residual contamination; protecting groundwater monitoring equipment; and preserving access to the sites and associated monitoring equipment for the DON and the FFA signatories. Such institutional controls shall consist of lease/deed restrictions, MOUs, or other controls mutually agreed to by the FFA signatories and agencies to which the property is being transferred. The DON shall notify the U.S. EPA, DTSC, RWQCB, CIWMB, and the LEA in the event of a transfer of Sites 2 and 17. Transferees of Sites 2 and 17 will be required to notify the LEA and FFA signatories in the event of a significant land-use change at Sites 2 and 17 so that issues related to postremediation land use at these sites are managed appropriately.

9.2.1 Land-Use Control Restrictions

The institutional controls associated with Alternative 3 shall prohibit the following:

- residential use of the sites and construction of hospitals for humans, schools for persons under 21 years of age, day care centers for children, or any permanently occupied human habitation on the sites;
- construction of facilities, structures, or appurtenances; excavation; or any other land-disturbing activity into or on the surface of the landfills that may affect the drainage or increase erosion or infiltration unless prior approval is obtained from the DON and the FFA signatories;
- construction of structures within 1,000 feet of the edge of the landfill without prior approval of the DON (the DON intends to draft this restriction in a manner that will ensure the prompt and reasonable exercise of judgment by the DON);
- planting deep-rooted plants that could threaten the integrity of the landfill cap;
- irrigating the surface of the landfill;
- exposing or extracting groundwater from the shallow or principal aquifer at Site 2 without prior approval of the DON;
- land-disturbing activity on lands adjacent to the landfill that may cause adverse effects upon the landfill through erosion of the surface or diversion of off-site surface water runoff onto the landfill, unless the land owner of the adjacent property provides for mitigation of such adverse effects (e.g., through structural drainage and erosion control measures such as diversion channels, riprap) and obtains the prior approval of DON and FFA signatories (the DON intends to draft this restriction in a manner that will ensure the prompt and reasonable exercise of judgment by the DON); and

Enclosure 2 Example of Institutional Controls Provisions for Inactive and Closed Landfills

- the removal of or damage to security features (e.g., locks on monitoring wells) or to monitoring equipment and associated pipelines and appurtenances.

Institutional controls shall also be used to ensure that the DON and FFA signatories have the right to enter and inspect the property, perform monitoring activities, ensure the viability of the land-use control restrictions, and perform any additional response actions.

9.2.2 Land-Use Control Implementation and Certification Plan

The O&M Plan for Sites 2 and 17 required under Subparagraph 7.3(a)(17) of the FFA shall include an attachment entitled Land-Use Control Implementation and Certification Plan addressing the following elements:

- a description and location of the sites, including a map; the approximate size of the site; and a description of any chemicals of concern;
- the land-use control objectives and restrictions stated in the ROD;
- the specific legal mechanism that will be used to achieve the ROD's land-use control objectives and restrictions;
- the required frequency for periodic inspection of the sites;
- identification of the entities responsible for carrying out the monitoring and inspection;
- the methods for periodically certifying compliance with institutional controls upon completion of inspections; and
- procedures for notifying the DON and FFA signatories in the event of a failure to comply with land-use restrictions.

9.2.3 Environmental Restriction Covenant and Agreement

As noted in Section 7.2.1.4, DON and DTSC shall enter into good faith negotiations to enter into an Environmental Restriction Covenant and Agreement. This agreement will serve as the mechanism to implement the institutional controls for Sites 2 and 17. In addition, DON shall include the same environmental restrictions in the deed between the United States and the transferee(s). DTSC shall be identified in the deed as a covenantee. The deed will be recorded in the Office of the County Recorder for the County of Orange.



INSTITUTIONAL CONTROLS

What they are and how they are used

WHAT IS AN INSTITUTIONAL CONTROL?

The purpose of this fact sheet is to provide an overview of Institutional Controls (IC) and how they are used. A separate fact sheet is being developed on establishing and maintaining ICs as part of an environmental cleanup remedy decision. That fact sheet will also be available on the Department of Defense (DoD) BRAC Environmental homepage at <http://www.dtic.mil/envirodod/envbrac.html>.

- ICs have a long history as a tool in property law and their use in a non-environmental context is quite common. An example of an IC in a non-environmental context is a prohibition against having a television reception satellite dish in a planned community.
- An IC is a legal or institutional mechanism that limits access to or use of property, or warns of a hazard. An IC can be imposed by the property owner, such as use restrictions contained in a deed or by a government, such as a zoning restriction.

USES OF INSTITUTIONAL CONTROLS IN ENVIRONMENTAL CLEANUP

- ICs are used to ensure protection of human health and the environment.
- ICs are used to protect ongoing remedial activities and to ensure viability of the remedy.
- ICs are specifically provided for by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP).
- DoD has used and will use ICs in remedial activities during cleanup and as part of a final remedy.

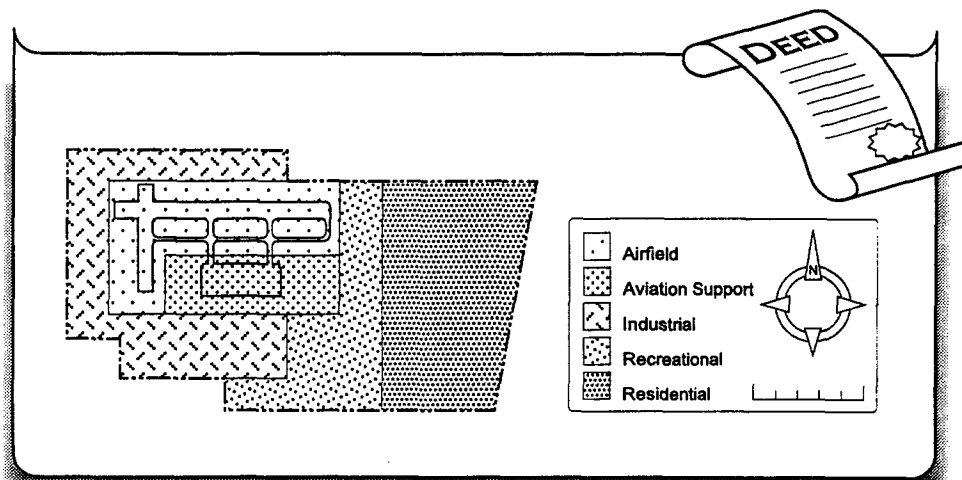
TYPES OF INSTITUTIONAL CONTROLS

ICs fall into two categories:

- Proprietary controls
- Governmental controls

WHAT IS A PROPRIETARY CONTROL?

- A proprietary control is a private contractual mechanism contained in

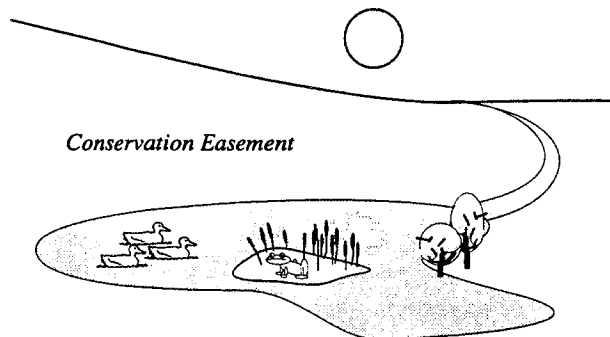


the deed or other document transferring the property.

- Proprietary controls involve the placement of restrictions on land through the use of easements, covenants, and reversionary interests. Easements, covenants, and reversionary interests are nonpossessory interests. Nonpossessory interests give their holders the right to use or restrict the use of land, but not to possess it.
- State law varies on the application and enforcement of such restrictions.

What is an Easement?

- An easement allows the holder to use the land of another, or to restrict the uses of the land. For example, a conservation easement restricts the owner to uses that are compatible with conservation of the environment or scenery.



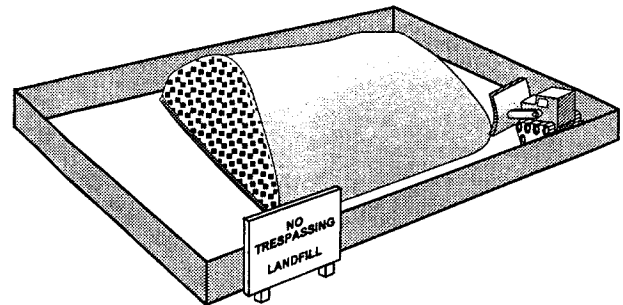
- If the owner violates the easement, the holder may bring suit to restrain the owner.
- An easement "appurtenant" provides a specific benefit to a particular piece of land. For example, allowing a neighbor to walk across your land to get to the beach. The neighbor's land, the holder of the easement, benefits by having beach access through your land.
- An easement "in gross" benefits an individual or company. For example, allowing the utility company to come on your land to lay a gas line. The utility company, the holder of the easement, benefits by having use of the land to lay the gas line.
- An affirmative easement allows the holder to use another's land in a way that, without the ease-

ment, would be unlawful-- for example, allowing a use that would otherwise be a trespass.

- A negative easement prohibits a lawful use of land — for example, creating a restriction on the type and amount of development on land.

What is a Covenant?

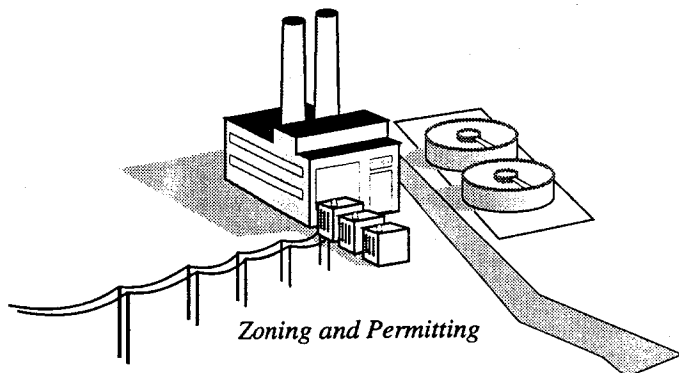
- A covenant is a promise that certain actions have been taken, will be taken, or may not be taken.
- Covenants can bind subsequent owners of the land. There are special legal requirements needed to bind subsequent owners.
- An affirmative covenant is a promise that the owner will do something that the owner might not otherwise be obligated to do -- for example, maintaining a fence on the property that surrounds a landfill.



- A negative covenant is a promise that an owner will not do something that the owner is otherwise free to do -- for example, restricting the use of groundwater on the land.

What is a Reversionary Interest?

- A reversionary interest places a condition on the transferee's right to own and occupy the land. If the condition is violated, the property is returned to the original owner or the owner's successors.
- Each owner in the chain of title must comply with conditions placed on the property. If a condition is violated the property can revert to the original owner, even if there have been several transfers in the chain of title.



WHAT IS A GOVERNMENTAL CONTROL?

- Governmental controls are restrictions that are within the traditional police powers of state and local governments to impose and enforce.
- Permit programs and planning and zoning limits on land use are examples of governmental controls.

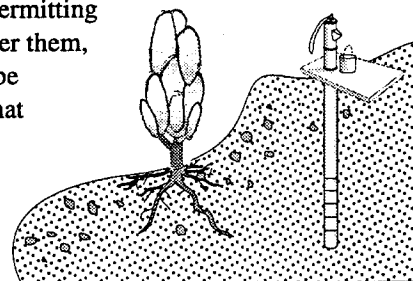
What are possible governmental controls?

- **Zoning**— Use restrictions imposed through the local zoning or land use planning authority. Such

restrictions can limit access and prohibit disturbance of the remedy. Zoning authority does not exist in every jurisdiction.

- **Siting restrictions** — Control land use in areas subject to natural hazards, such as earthquakes, fires, or floods. Such restrictions are created through statutory authority to require that states implement and enforce certain land use controls as well through local ordinances.

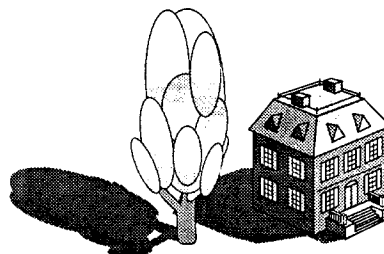
- **Groundwater restrictions**— Specific classification systems used to protect the quality of or use of ground water. These systems operate through a state well permitting system. Under them, criteria may be established that must be met before a use permit or construction is allowed.



Examples of the Application of Institutional Controls

Historic Preservation at U.S. Customs House, Boston

In 1987, the Custom House in Boston was deemed excess and the General Services Administration (GSA), through special legislation, sold it to the Boston Redevelopment Authority. At the time of the sale, the GSA placed an historic preservation covenant in the deed to protect the exterior architectural and structural integrity of the building. The Boston Redevelopment Authority wanted to resell the Custom House to a developer that planned to connect it by a skyway to a building half a block away. When GSA refused to remove the historic covenant, the deal fell through. Several years later, the Marriott Corporation proposed a plan to buy the Custom House and create an urban park between the Marriott at the Wharf and the Custom House. Under the plan, the building will retain its historic appearance and will be used as one of Marriott's time-share properties.



Examples of the Application of Institutional Controls

Limiting Subsurface Use at Former Minuteman Missile Silos

With the end of the Cold War, the Department of Defense announced the retirement of the Force Minuteman missile system in North and South Dakota and Missouri. As allowed by the Strategic Arms Reduction Treaty, the Air Force, after extensive technical analysis and public comment, determined that dismantlement of the missile facilities would be accomplished by imploding the structures, capturing the contamination within the concrete structures; capping each structure with a combination of three feet of soil and a thick plastic liner; and contouring the landscape at an additional depth of seven feet above the facility. The Air Force also determined that CERCLA 120(h) applied to the transfer of these facilities to non-federal entities. The Air Force and the U.S. Environmental Protection Agency (EPA) found a sensible approach to address environmental issues, which was formalized in an agreement between the two agencies. The agreement calls for the GSA in disposing the property to notify federal and state regulators when the property is transferred; provide prior notice to and obtain the approval of federal and state regulators for any construction or other activity that would affect the underground facility or groundwater monitoring wells; and place restrictions in the deed of conveyance to prohibit future property owners from installing water wells or otherwise physically penetrating beneath the surface of the site below two feet. The Air Force and regulators also were provided with rights of access. The ICs are in place for the disposal of these missile sites in North and South Dakota and Missouri.

Other Sources of Information

1. John Pendergrass, *Use of Institutional Controls as Part of a Superfund Remedy: Lessons from Other Programs*, 26 ELR 10219 (March 1996).
2. Report of the Future Land Use Working Group to the Defense Environmental Response Task Force, *Types of Institutional Controls*, (May 1996), available on DoD BRAC environmental homepage at <http://www.dtic.mil/envirodod/envbrac.html>.
3. Report to the Future Land Use Working Group to the Defense Environmental Response Task Force, *Making Institutional Controls Effective*, (September 1996) available on DoD BRAC environmental homepage at <http://www.dtic.mil/envirodod/envbrac.html>.

NOTICE

We welcome and invite your comments on this fact sheet, as we seek ways to improve the information provided. Please send comments to the following address:

OADUSD (Environmental Cleanup)

Attn: Fast-track Cleanup
3400 Defense Pentagon
Washington, D.C. 20301-3400.



February 1998

A Guide to Establishing Institutional Controls at Closing Military Installations

About This Guide

This guide supplements the land use matrix developed under the February 1996 "Guide to Assessing Reuse and Remedy Alternatives at Closing Military Installations" by helping to ensure the compatibility between the selected land use and the selected remedy. The land use matrix is intended as a tool to build consensus among Base Realignment and Closure (BRAC) cleanup teams (BCTs), local redevelopment authorities (LRAs), restoration advisory boards (RABs), and other community members, as well as to identify and resolve the complex restoration and reuse issues at closing installations. This guide further explains land use restrictions, namely institutional controls (ICs), that may be associated with a restoration and reuse alternative. This guide is intended to:

ICs are mechanisms that protect property users and the public from existing site contamination that continues to be present during the use of a site.

- facilitate, early in the process, discussions among stakeholders to enhance understanding of ICs, i.e., what they are and how they might be used as part of a proposed remedy alternative in the BRAC cleanup program;
- act as a planning tool and checklist to assist stakeholders in considering a selected remedy which does in fact include the use of ICs; and
- provide a framework for building cooperation among the stakeholders in the establishment and maintenance of ICs.

For a particular restoration and reuse alternative, the stakeholders may identify the need for ICs. This guide assumes that the LRA will take the environmental condition of property into account in development of its reuse plan, and that use restrictions will be included in the remedy decision arrived at through the remedy selection process. In this guide, ICs are taken to be mechanisms that protect property users and the public from existing contamination that continues to be present during the use of a site. A more detailed explanation of ICs is presented in the BRAC Environmental Program Fact Sheet: *Institutional Controls: What They Are and How They Are Used* (see "Where to Learn More," page 8). There may be other ICs associated with the property but not related directly to an environmental response action, such as historic and cultural preservation, access for utility maintenance, or ecological concerns, e.g., wetlands and wildlife protection.

Conflict can arise among stakeholders during the process of identifying and evaluating restoration and reuse alternatives. A detailed discussion of conflict resolution techniques can be found in the July 1996 document entitled *Partnering Guide for Environmental Missions of the Air Force, Army, and Navy* (see "Where to Learn More," page 8). That guide provides techniques for forming and maintaining an effective problem-finding, problem-solving team. By applying the techniques described, the parties involved in establishing and maintaining ICs can identify common issues and maximize the effectiveness of the tools available to each.



What Is the Role of Institutional Controls in the Remedy Selection Process?

The potential need for ICs is identified when stakeholders develop the land use matrix recommended in the BRAC Environmental Program Fact Sheet: *A Guide to Assessing Reuse and Remedy Alternatives at Closing Military Installations*. When various restoration and reuse alternatives are being developed, the first question to be asked is:

Does this alternative require some sort of control or limit on use of the property?

If the answer to that question is "yes," then this guide should be used to evaluate how an IC would be established. Considering the pros and cons of establishing and maintaining ICs should be an integral part of the decision-making process in the selection of a restoration action. When ICs are used, they are a vital part of the remedy and must be maintained to protect human health and the environment. ICs are legal mechanisms, such as deed restrictions, and may be coupled with physical controls, such as signs posted at the site or fences. The control or notice mechanism will vary depending on the nature of the contamination, its location, the targeted land use, the structures located on the site, and the length of time for which the use is restricted.

During remedy selection, the nature and extent of specific limits placed on future property use should be discussed with the community and the LRA so that they may be considered in planning reuse of BRAC property.

Once remedy alternatives, including ICs, have been identified, the remedy selection process is applied to evaluate the alternative as a whole, including any ICs involved. For example, using the process under the National Contingency Plan (NCP) for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the BCT will develop a proposal on which the public and regulatory agencies will be invited to comment — both in writing and at a public meeting. A response to those comments will be prepared, and a response action selected. Throughout the remedy selection process, the ICs will be evaluated in the same manner as all other components of a potential remedy, as required by statute and Executive Order 12580. Stakeholders need to seriously consider and discuss all aspects of establishing, maintaining, and funding ICs as part of a remedy.

Two situations commonly occur in which ICs play an important role: (1) to protect the integrity of an engineering control intended to contain contamination, reduce its mobility, and minimize exposure, such as a landfill cap, and (2) to limit the exposure of individuals to residual contamination by limiting the reuse activities associated with that portion of the installation.

The information collected during the Remedial Investigation is used to determine if contamination is present and to characterize the site. In some cases, removing all contamination to allow unrestricted use of property may be very costly, the technology may be unavailable, or the time required to remediate and transfer the property may be prohibitive considering the community's reuse requirements for planned reuse and timing of property transfer.

The preferred remedy, protective of human health and the environment, sometimes requires that contaminants not be disturbed, leaving them in place. For example, the excavation of landfills can actually increase the risk to human health and the environment, in the short term, by exposing toxic contamination. One approach to reducing the long-term risk associated with such contamination left in place is to limit the uses to which that property will be put. The limit may be broad — for example, no residential occupancy — or it may be specific — for example, any activity involving the disturbance of soil must be approved in advance and any excavated soil must be disposed of properly.

During the remedy selection, the nature and extent of the specific limits placed on future property use should be discussed with the community and the LRA so that they may be considered in planning reuse of BRAC property. Although the final details, such as engineering plans, zoning plans, and certain longer-term ICs such as deed restrictions, will not be determined until the Remedial Design is developed, the Feasibility Study (FS) should provide as clear a description as possible of the nature of the anticipated restrictions. Another important element of the FS is the anticipated duration of the restriction. If the



restriction is limited to a relatively short period during the actual remediation, it will have a very different impact on reuse than a restriction that is anticipated to last for a longer period of time. Such a longer-term restriction, for example, might be a restriction on groundwater use until treatment or attenuation has reduced contaminant levels to below health-based standards or a restriction on surface use over a landfill cap.

The proposed plan outlines the preferred remedial alternative and summarizes the other alternatives considered in the FS. The proposed plan should be written in a manner that can be easily understood by the public. A clear statement of the restrictions associated with the proposed action should be included to allow the public to be fully informed about the proposed action and implications of using ICs if they are a part of that action. The remedy selection process under CERCLA and the Environmental Protection Agency's (EPA) position on the use of ICs are described in the National Contingency Plan (NCP) (40 CFR Part 300.430(a)(1)(iii)) and its preamble (55 FR 8706). Under the NCP, community acceptance is one of the nine criteria for selecting a CERCLA remedy. While community acceptance is an essential ingredient in making the final remedy selection, it is not always possible to accomplish all the community's goals. It is the Department of Defense's (DoD) responsibility to make the final remedy selection in accordance with applicable laws and requirements and to ensure that it will be protective of human health and the environment, as well as be compatible with, to the extent reasonably practicable, community reuse plans. This final remedy selection is formalized through the Record of Decision (ROD), which will be compatible with any ICs that may be implemented at the site.

When the Selected Response Includes Institutional Controls

Form a Team

When a selected response includes ICs, the team members (see box) involved in developing the future land use and evaluating the response should work together to establish and maintain the selected ICs. Requirements for establishment and maintenance of ICs vary from site to site and are dependent on the real property and environmental cleanup laws and regulations of that jurisdiction. Cooperation, therefore, is essential to achieve success. That success depends on building a team that will be effective in using the tools available at that site and in that location.

Team members already should be a part of the process through their participation in groups such as those listed in the box below. Key members of these existing entities (although others may be consulted as necessary) should be part of the team developing a plan for the success of ICs at that site. It is important to build a team that works together to ensure the success of the response action and the effective reuse of the land.

The Team	
Team Member	Potential Role in Establishing and Maintaining ICs
BRAC Cleanup Team	Identify the remaining contamination and associated risks at a site that requires ICs
Local Redevelopment Authority	Identify the intended use of the site consistent with the environmental condition of property that may require ICs; may assist in the establishment of ICs
Community Stakeholders (including the RAB)	Provide input and recommendations on establishing and maintaining ICs
Base Transition Coordinator	Facilitate the coordination of information for property reuse and transfer with cleanup activities, including establishment of ICs
Real Estate Attorney/Environmental Attorney	Develop deed language for restrictions; may assist in developing other ICs
Federal, State, and Local Government Officials	Establish, monitor, or enforce ICs
Identified Holders of Property Interest	Maintain a use of the site that is consistent with ICs



Establish Cooperation

Such success will be easier to achieve when the following commitments are made:

- The team makes a commitment to the success of ICs
- The team develops the skills needed to work together well
- Throughout the process, all team members make a commitment to open communication
- The team members maintain mutual trust, honor, and respect
- The team members accept responsibility, make decisions, take risks, and resolve issues
- The team makes decisions through consensus
- The team develops creative solutions and applies them to all problems
- The team maintains agreed-upon processes for resolving disagreements or disputes
- The team evaluates progress and recognizes successes

The Task of the Team

This guide identifies issues that may be relevant to any number of response actions. It does not suggest how to resolve specific issues, but offers tools that the team may find useful. It is up to the team establishing the ICs to develop and implement a plan that uses these and other tools and the resources available to them at that site to create an effective remedy.

Checklist of Issues and Tools To Be Considered When Establishing and Maintaining ICs

The following questions should be asked when DoD and stakeholders discuss how to establish and maintain ICs.

Q. What are the ICs meant to accomplish?

What types of reuse are possible, given the environmental condition of property and/or the planned remedial activities?
For example:

TYPE(S) OF REUSE ALLOWED

- ☐ Residential
 - ☐ Housing
 - ☐ Daycare
 - ☐ Hospitals
 - ☐ Schools
 - ☐ Other
- ☐ Commercial
- ☐ Industrial
- ☐ Recreation
- ☐ Agricultural
- ☐ Other



What are the activities that must be restricted? For example:

SPECIFIC RESTRICTIONS

- ☐ Uses of ground and surface water
 - ☐ Prohibitions against drinking the water
 - ☐ Prohibitions against use of groundwater from existing wells
 - ☐ Prohibitions against any other use of the water (e.g., irrigation, watering livestock, or recreational uses, including fishing)
 - ☐ Restrictions to maintain the integrity of monitoring and reinjection wells
 - ☐ Other
- ☐ Use of soils
 - ☐ Prohibitions against excavation, construction, drilling, or disturbance of the soil (e.g., well installation that may connect an uncontaminated aquifer with a contaminated aquifer, or maintaining landfill cap)
 - ☐ Restrictions governing depth of excavation
 - ☐ Other
- ☐ Other ICs not directly related to the environmental response
 - ☐ Restrictions preserving historic or cultural areas
 - ☐ Restrictions protecting wildlife or wetlands
 - ☐ Restrictions governing access to the property (e.g., utility maintenance)

Q. What are the techniques and tools available to establish and maintain ICs?

TECHNIQUES: METHODS FOR ACCOMPLISHING THE GOALS OF THE ICs

- ☐ **Layering:** Layering means the use of a strategy to combine mutually reinforcing controls, for example, a combination of deed restrictions, physical barriers, and notice can expand the number of parties involved and strengthen the network that maintains the remedy and protects human health and the environment. Many tools can be used at the same time and at various levels to accomplish that result. Different team members may have methods available to them that enhance maintenance of the remedy.
- ☐ **Notice:** Providing notice that controls exist at a site is essential to maintain those controls and ensure that users of the property abide by them. The more people who are aware of and responsible for an IC, the easier it is to ensure that the controls will be heeded and maintained.

The more people who are aware of and responsible for an IC, the easier it is to ensure that the controls will be heeded and maintained.

TOOLS: SPECIFIC ACTIONS THAT CAN BE USED TO IMPLEMENT THESE TWO TECHNIQUES

- ☐ **Deed Language:** Language in the deed is a good method of providing notice and generally will be an important part of any IC plan. The legal instrument and language used should be tailored to the requirements and processes that are best suited to the jurisdiction. The instrument, which may be separate from the deed, may be a covenant or easement or some other form of property right; however, before relying on any such right, the legality and enforceability of such a right in the jurisdiction must be determined. The legal instrument should provide a



A Guide to Establishing Institutional Controls At Closing Military Installations

stand-alone explanation of the restrictions and should cite the portions of the administrative record, regulations, and transfer documents that are relevant to establishing the restrictions. Language providing notice and describing the restrictions may also be included in the transfer documents.

Depending on state law, which may vary, and depending on the intentions of the parties to the original transaction and third parties who hold an interest in the land, deed language can be structured to give enforcement rights to the previous owner and to those third parties. Deed restrictions implementing ICs should be structured to run with the land — in other words, to remain in force despite changes in ownership; for example, by stating that the restrictions benefit the surrounding property and benefit the general public, or by stating that the parties intend the ICs to run with the land and bind future parties. State laws vary and the enforceability of deed restrictions should be considered carefully in structuring deed language. The more stakeholders that have authority to enforce a deed restriction, the more effective it will be as a method of control. In spite of any legal limits on the enforceability of deed language, a deed restriction is an important form of notice.

- ☐ **Records and Community Involvement:** Other available methods of providing notice include the administrative record for the response action; local records like planning and zoning maps and subdivision plats; and similar state records and registries. Means of community education such as public meetings, recurring notices in newspapers, and signs and fences also provide notice.
- ☐ **Federal, state, and local laws and regulations:** Statutory authority under CERCLA and the Resource Conservation and Recovery Act (RCRA) may provide Federal and state regulators direct legal authority to protect human health and the environment, prevent releases, or control site activities. State and local governments may also play a role through already existing legal frameworks or regulatory programs such as permitting the use of land, monitoring public health through public health statutes, authorizing zoning and land use plans, passing ordinances, and acting under established statewide environmental programs. Such legal avenues can be integrated into an IC plan and provide notice that activities at the site in question are restricted.
- ☐ **Inspections:** There may be inspections of the affected property associated with the selected remedy, generally as part of the remedy's operation and maintenance. Even though these inspections may not be intended for the purpose of monitoring an IC, they may provide an opportunity to assess activities at the site. For example, an inspection of monitoring wells may also provide an opportunity to establish compliance with an IC restricting excavation. Other existing inspection routines associated with regulatory programs not related to the remediation may also protect the site in question. While such inspections should not be confused with the ICs themselves, they can be used to assist in the maintenance of ICs. Such existing programs can be integrated into an IC plan in association with or in addition to the state and local laws and regulations listed above. The state and Federal members of the BCT may give the appropriate section or branch of the environmental regulatory agency or other pertinent agency notice of the IC or deed restriction by adding the organization's representative to the finding of suitability to transfer distribution list. In addition, the Federal government is required to review a remedy at least every five years, where contamination remains in place. Where ICs are part of the remedy, such reviews should include verification that the ICs are still in place and effective.
 - ☐ Remedy-specific environmental inspections (generally part of operation and maintenance of a remedy)
 - ☐ Inspections to ensure the integrity of the landfill cap
 - ☐ Inspections of the leachate treatment system
 - ☐ Inspections of the water treatment system
 - ☐ Other inspections required for operation and maintenance



- ☐ Other Federal, state, and local government inspections not directly related to the environmental response
 - ☐ Restrictions preserving historic or cultural areas
 - ☐ Restrictions protecting wildlife or wetlands
 - ☐ Restrictions governing access to the property (e.g., utility maintenance)
 - ☐ Restrictions concerning health
 - ☐ Restrictions concerning building standards
 - ☐ Other

Q. What are the responsibilities to maintain and ensure the effectiveness of ICs?

As a network for establishing an IC is created, it is also appropriate and necessary to discuss the associated responsibilities for maintaining its effectiveness. As previously noted, there are numerous existing statutory frameworks and regulatory programs at the Federal, state, and local levels that provide the authority to maintain the integrity of the remedy requirements. Stakeholders may need to discuss resources that are available or might be needed for certain ICs. They also need to discuss how long-term responsibilities for IC implementation at the site will be coordinated among team members.

- ☐ Statutory authority to enforce RCRA and CERCLA
- ☐ State and local, general or site-specific enforcement authorities that can be applied
 - ☐ Property laws
 - ☐ Zoning
 - ☐ Permitting programs
 - ☐ Other laws or ordinances
- ☐ Funding maintenance of the IC
- ☐ Long-term coordination responsibilities

Q. How is an IC modified or terminated?

ICs may also be modified or terminated over time. It is therefore useful to discuss what time frames, if known, and what procedures may be necessary for accomplishing these tasks. Due to the site-specific nature of IC plans, procedures for modifications to ICs may vary depending on that plan.

- ☐ Length of time ICs are needed
- ☐ Legal steps to remove or modify each IC
- ☐ Organizations that may be involved with modification or termination:
 - ☐ Federal government
 - ☐ State government
 - ☐ State court
 - ☐ Local government
 - ☐ Local court
 - ☐ Landowner
 - ☐ Adjacent landowner
 - ☐ Previous landowner



Where to Learn More

Further information on this and other BRAC issues can be found by reading:

- DoD's Future Land Use Policy: *Responsibility for Additional Environmental Cleanup after Transfer of Real Property* (July 1997)
- BRAC Environmental Program Fact Sheet: *Institutional Controls: What They Are and How Are They Used* (Spring 1997)
- BRAC Environmental Program Fact Sheet: *A Guide to Assessing Reuse and Remedy Alternatives at Closing Military Installations* (February 1996)
- *Fast Track to FOST: A Guide to Determining if Property is Environmentally Suitable for Transfer* (Fall 1996)
- *Partnering Guide for Environmental Missions of the Air Force, Army, and Navy* (July 1996)

Or by contacting:

Office of the Assistant Deputy Under Secretary of Defense
(Environmental Cleanup)
Attn: Fast-Track Cleanup
3400 Defense Pentagon
Washington, D.C. 20301-3400

Or by looking on the World Wide Web at:

<http://www.dtic.mil/envirodod/envbrac.html>

For additional information about selection of response actions, see the following EPA Office of Solid Waste and Emergency Response (OSWER) documents:

- Land Use in CERCLA Remedy Selection Process, OSWER Publication Number PB95-963234\NDZ (June 1995)
- Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions, OSWER Publication Number 9355.0-30 (April 1991)
- A Guide to Selecting Superfund Remedial Actions, OSWER Publication Number 9355.0-27FS (April 1990)

These are available on the World Wide Web at:

<http://www.epa.gov/epa/oswer>

The *Guide to Establishing Institutional Controls at Closing Military Installations* was prepared with input from an inter-agency work group made up of representatives of the Office of the Secretary of Defense, the DoD Components, the U.S. EPA, the General Services Administration, the California EPA, the National Association of Attorneys General, the International City/County Management Association, the National Association of Installation Developers, and others. This guide is not a formal statement of DoD policy, but is meant to assist in the establishment and maintenance of ICs at BRAC properties.

Local reproduction of this fact sheet is authorized and encouraged.



ACQUISITION AND
TECHNOLOGY

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-3010

JUL 25 1997



MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY
(INSTALLATIONS, LOGISTICS AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE NAVY
(INSTALLATIONS AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE AIR FORCE
(MANPOWER, RESERVE AFFAIRS, INSTALLATIONS AND
ENVIRONMENT)
DEPUTY UNDER SECRETARY OF DEFENSE
(ENVIRONMENTAL SECURITY)
DEPUTY UNDER SECRETARY OF DEFENSE
(INDUSTRIAL AFFAIRS AND INSTALLATIONS)
DIRECTOR, DEFENSE LOGISTICS AGENCY (D)

SUBJECT: Responsibility for Additional Environmental Cleanup after Transfer of Real Property

The purpose of the attached policy is to describe the circumstances under which DoD would perform additional cleanup on DoD property that is transferred by deed to any person or entity outside the federal government. This policy is applicable to real property under DoD control that is to be transferred outside the federal government, and is effective immediately. For property that is transferred pursuant to section 120(h)(3)(C) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 USC 9620(h)(3)(C)), this policy applies after the termination of the deferral period.

DoD continues to be committed to a remedy selection process that provides for full protection of human health and the environment, even after property has been transferred by DoD. The Deputy Under Secretary of Defense (Environmental Security) will issue separately any specific guidance needed to implement this policy. This policy should be read to be compatible with and does not supersede other related DoD policies, and is to be incorporated in the next revision of the appropriate DoD Instruction. I ask for your support in implementing this policy and working with communities so that they can make informed decisions in developing their redevelopment plans.

R. Noel Longuemare
Acting Under Secretary of Defense
(Acquisition and Technology)

Attachment



DoD Policy on Responsibility for Additional Environmental Cleanup After Transfer of Real Property

Background. This policy is instituted within the framework established by land use planning practices and land use planning authorities possessed by communities, and the environmental restoration process established by statute and regulation. The land use planning and environmental restoration processes – two separate processes – are interdependent. Land use planners need to know the environmental condition of property in order to make plans for the future use of the land. Similarly, knowledge of land use plans is needed in order to ensure that environmental restoration efforts are focused on making the property available when needed by the community and that remedy selection is compatible with land use. This policy does not supplant either process, but seeks to integrate the two by emphasizing the need to integrate land use planning assumptions into the cleanup, and to notify the community of the finality of the cleanup decisions and limited circumstances under which DoD would be responsible for additional cleanup after transfer.

Cleanup Process. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 USC 9601 et seq.) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 CFR 300) establish the requirements and procedures for the cleanup of sites that have been contaminated by releases of hazardous substances. CERCLA, furthermore, requires that a deed for federally owned property being transferred outside the government contain a covenant that all remedial action necessary to protect human health and the environment has been taken, and that the United States shall conduct any additional remedial action "found to be necessary" after transfer. Within the established restoration process, it is DoD's responsibility, in conjunction with regulatory agencies, to select cleanup levels and remedies that are protective of human health and the environment. The environmental restoration process also calls for public participation, so that the decisions made by DoD and the regulatory agencies have the benefit of community input.

Land Use Assumptions in Cleanup Process. Under the NCP, future land use assumptions are developed and considered when performing the baseline risk assessment, developing remedial action alternatives, and selecting a remedy. The NCP permits other-than-residential land use assumptions to be considered when selecting cleanup levels and remedies, so long as selected remedies are protective of human health and the environment. The U.S. Environmental Protection Agency (EPA) further amplified the role of future land use assumptions in the remedy selection process in its May 25, 1995, "Land Use in the CERCLA Remedy Selection Process" directive (OSWER Directive No. 9355.7-04).

Development of Land Use Plans. By law, the local community has been given principal responsibility for reuse planning for surplus DoD property being made available at Base Realignment and Closure (BRAC) installations. That reuse planning and implementation authority is vested in the Local Redevelopment Authority (LRA) described in the DoD Base Reuse Implementation Manual (DoD 4165.66-M). The DoD Base Reuse Implementation Manual calls for the LRA to develop the community redevelopment plan to reflect the long term needs of the community. A part of the redevelopment plan is a "land use plan" that identifies the proposed land use for given portions of the surplus DoD property. The DoD is committed to working with local land use planning authorities, local government officials, and the public to develop realistic assumptions concerning the future use of property that will be transferred by DoD. The DoD will act on the expectation that the community land use plan developed by the LRA reflects the long-range regional needs of the community.

Use of Land Use Assumptions in the Cleanup Process. DoD environmental restoration efforts for properties that are to be transferred out of federal control will attempt, to the extent reasonably practicable, to facilitate the land use and redevelopment needs stated by the community in plans approved prior to the remedy selection decision. For BRAC properties, the LRA's redevelopment plan, specifically the land use plan, typically will be the basis for the land use assumptions DoD will consider during the remedy selection process. For non-BRAC property transfers, DoD environmental restoration efforts will be similarly guided by community input on land use, as provided by the local government land use planning agency. In the unlikely event that no community land use plan is available at the time a remedy selection decision requiring a land use assumption must be made, DoD will consider a range of reasonably likely future land uses in the remedy selection process. The existing land use, the current zoning classification (if zoned by a local government), unique property attributes, and the current land use of the surrounding area all may serve as useful indicators in determining likely future land uses. These likely future land uses then may be used for remedy selection decisions which will be made by DoD (in conjunction with regulatory agencies) in accordance with CERCLA and the NCP.

DoD's expectation is that the community at-large, and in particular the land use planning agency, will take the environmental condition of the property, planned remedial activities, and technology and resource constraints into consideration in developing their reuse plan. The February 1996 "Guide to Assessing Reuse and Remedy Alternatives at Closing Military Installations" provides a useful tool for considering various possible land uses and remedy alternatives, so that cost and time implications for both processes can be examined and integrated. Obviously, early development of community consensus and publication of the land use plan by the LRA or the land planning agency will provide the stability and focus for DoD cleanup efforts.

Applicable guidelines in EPA's May 25, 1995, "Land Use in the CERCLA Remedy Selection Process" Directive should be used in developing cleanup decisions using land use assumptions. For a remedy that will require restrictions on future use of the land, the proposed plan and record of decision (ROD) or other decision documents must identify the future land use assumption that was used to develop the remedy, specific land use restrictions necessitated by the selected remedy, and possible mechanisms for implementing and enforcing those use restrictions. Examples of implementation and enforcement mechanisms include deed restrictions, easements, inspection or monitoring, and zoning. The community and local government should be involved throughout the development of those implementation and enforcement mechanisms. Those mechanisms must also be valid within the jurisdiction where the property is located.

Enforcement of Land Use Restrictions. The DoD Component disposal agent will ensure that transfer documents for real property being transferred out of federal control reflect the use restrictions and enforcement mechanisms specified in the remedy decision document. The transfer document should also include a description of the assumed land use used in developing the remedy and the remedy decision. This information required in the transfer documents should be provided in the environmental Finding Of Suitability to Transfer (FOST) prepared for the transfer. The DoD Component disposal agent will also ensure that appropriate institutional controls and other implementation and enforcement mechanisms, appropriate to the jurisdiction where the property is located, are either in-place prior to the transfer or will be put in place by the transferee as a condition of the transfer. If it becomes evident to the DoD Component that a deed restriction or other institutional control is not being followed, the DoD Component will attempt to ensure that appropriate actions are taken to enforce the deed restriction.

The DoD expects the transferee and subsequent owners to abide by restrictions stated in the transfer documents. The DoD will reserve the right to enforce deed restrictions and other institutional controls, and the disposal agent will ensure that such language is also included in the transfer documents. If DoD becomes aware of action or inaction by any future owner that will cause or threaten to cause a

Policy on Responsibility for Additional Environmental Cleanup

release or cause the remedy not to perform effectively, DoD also reserves the right to perform such additional cleanup necessary to protect human health and the environment and then to recover costs of such cleanup from that owner under the terms of the transfer document or other authority.

Circumstances Under Which DoD Would Return to do Additional Cleanup. A determination may be made in the future that the selected remedy is no longer protective of human health and the environment because the remedy failed to perform as expected, or because an institutional control has proven to be ineffective, or because there has been a subsequent discovery of additional contamination attributable to DoD activities. This determination may be made by DoD as a part of the remedy review process, or could be a regulatory determination that the remedy has failed to meet remediation objectives. In these situations, the responsible DoD Component disposing of the surplus property will, consistent with CERCLA Section 120(h), perform such additional cleanup as is both necessary to remedy the problem and consistent with the future land use assumptions used to determine the original remedy. Additionally, after the transfer of property from DoD, applicable regulatory requirements may be revised to reflect new scientific or health data and the remedy put in place by DoD may be determined to be no longer protective of human health and the environment. In that circumstance, DoD will likewise, consistent with CERCLA Section 120(h), return to perform such additional cleanup as would be generally required by regulatory agencies of any responsible party in a similar situation. Also note that DoD has the right to seek cost recovery or contribution from other parties for additional cleanup required for contamination determined not to have resulted from DoD operations.

Circumstance Under Which DoD Would Not Return to do Additional Cleanup. Where additional remedial action is required only to facilitate a use prohibited by deed restriction or other appropriate institutional control, DoD will neither perform nor pay for such additional remedial action. It is DoD's position that such additional remedial action is not "necessary" within the meaning of CERCLA Section 120(h)(3). Moreover, DoD's obligation to indemnify transferees of closing base property under Section 330 (of the Fiscal Year 1993 Defense Authorization Act) would not be applicable to any claim arising from any use of the property prohibited by an enforceable deed restriction or other appropriate institutional control.

Changes to Land Use Restrictions after Transfer. Deed restrictions or other institutional controls put in place to ensure the protectiveness of the remedy may need to be revised if a remedy has performed as expected and cleanup objectives have been met. For example, the specified groundwater cleanup levels have been reached after a period of time. In such a case, the DoD Component disposing of the surplus property will initiate action to revise the deed restrictions or other institutional controls, as appropriate.

DoD will also work cooperatively with any transferee of property that is interested in revising or removing deed restrictions in order to facilitate a broader range of land uses. Before DoD could support revision or removal, however, the transferee would need to demonstrate to DoD and the regulators, through additional study and/or remedial action undertaken and paid for by the transferee, that a broader range of land uses may be undertaken consistent with the continued protection of human health and the environment. The DoD Component, if appropriate, may require the transferee to provide a performance bond or other type of financial surety for ensuring the performance of the additional remedial action. The transferee will need to apply to the DoD Component disposal agent for revision or removal of deed restrictions or other institutional controls. Effective immediately, the process for requesting the removal of such restrictions by a transferee should be specified by the disposal agent in the documents transferring property from DoD.

Making those revisions or changes will be considered by DoD to be an amendment of the remedy decision document. Such an amendment will follow the NCP process and require the participation by DoD and regulatory agencies, as well as appropriate public input.

Disclosure by DoD on Using Future Land Use in Remedy Selection. A very important part of this policy is that the community be informed of DoD's intent to consider land use expectations in the remedy selection process. At a minimum, disclosure shall be made to the Restoration Advisory Board (or other similar community group), the LRA (if BRAC) or other local land use planning authority, and regulatory agencies. The disclosure to the community for a specific site shall clearly communicate the basis for the decision to consider land use, any institutional controls to be relied upon, and the finality of the remedy selection decision, including this policy. In addition, any public notification ordinarily made as part of the environmental restoration process shall include a full disclosure of the assumed land use used in developing the remedy selected.

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FORMER MCAS EL TORO RAB MEETING

IRP Site 1 Remedial Investigation (RI) Ordnance/Explosives (OE) Range Evaluation Field Work Update January 30, 2002

Presented By
Eli Vedagiri
EARTH TECH, Inc.

SITE 1 RI/OE Range Evaluation Field Work Update

RI Work Plan Summary

- **OBJECTIVE**
 - Establish Baseline Conditions (chemical contamination)
 - Characterize potential risk to Human Health/Environment
- **DATA COLLECTION**
 - Grid Soil Sampling: Shallow Depth Locations (Tier 1)
 - Groundwater Sampling (Tier 1)
 - Surface Water Sampling (Tier 1, 2, and 3)
 - Trench/Pothole Soil Sampling (Tier 2)
 - Deep Soil Sampling (if required, Tier 3)
 - Install Additional Groundwater Wells/Sampling (Tier 3)

SITE 1
RI/OE Range Evaluation Field Work Update

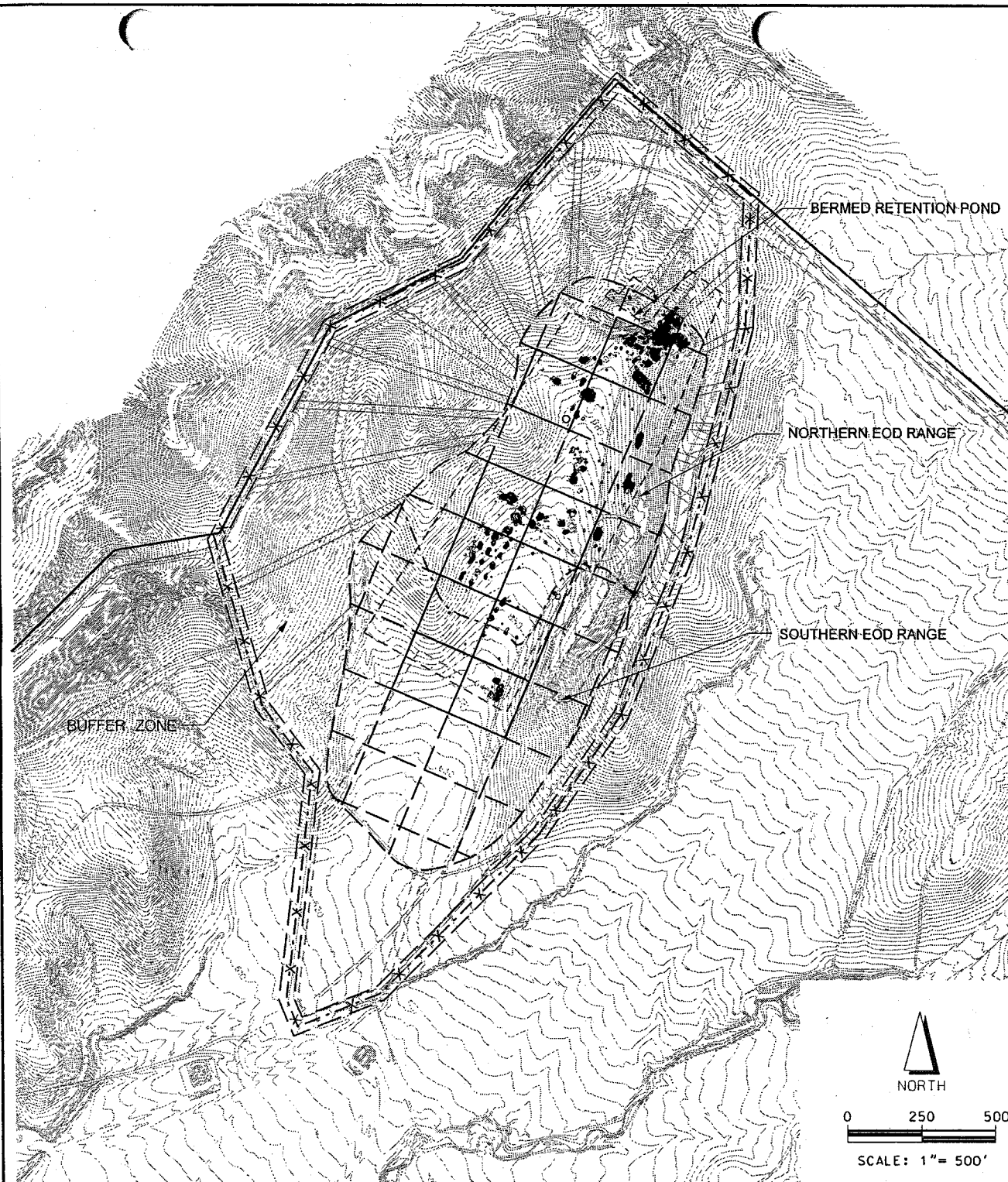
RI Field Activities

- **TIER 1**
 - Sampled 12 Groundwater Wells (Jan. 8-14, 02)
 - Collected Soil Samples at 39 Locations at 1.5 and 5 Feet Depths (Jan. 15-18, 02)
- **TIER 2 (Jan. 28-Feb. 8, 02)**
 - Currently collecting Soil Samples from Trenches/Potholes
- **LAB ANALYSES**
 - Petroleum Hydrocarbons, VOCs, SVOCs, Perchlorate, Dioxins/Furans, Explosives, and Metals

SITE 1
RI/OE Range Evaluation Field Work Update

OE Range Evaluation Work Plan Summary

- **OBJECTIVE**
 - Establish Baseline Conditions (Explosives Hazard Characterization)
 - Characterize Explosive Safety Risk
- **DATA COLLECTION**
 - Northern/Southern EOD Ranges
 - Trenching/Potholing to Investigate Previously Identified Anomalies
 - Characterize Unearthed Items
 - Buffer Zone and Site Perimeter
 - Surface Sweep
 - Geophysical Survey to Identify Anomalies
 - Trenching/Potholing (if required)




EXPLANATION

- MCAS EL TORO BOUNDARY
- *--* SECURITY FENCE/SITE 1 BOUNDARY
- EOD RANGE BOUNDARY
- 25' WIDE GEOPHYSICAL SURVEY RADIAL LANES (SHOWN DASHED IN AREAS COVERED BY PREVIOUS SURVEYS)
- SURFACE AND GEOPHYSICAL SURVEY PATHS INSIDE AND OUTSIDE SITE PERIMETER
- BOUNDARY OF PHASE I GEOPHYSICAL SURVEY
- BOUNDARY OF PHASE II GEOPHYSICAL SURVEY
- GEOPHYSICAL ANOMALY
- 1-ACRE GRID SELECTED FOR INTRUSIVE INVESTIGATION OF ALL ANOMALIES WITHIN GRID (ONLY GRIDS SHOWN WITH SOLID LINES WILL BE SAMPLED)



0 250 500 FEET
SCALE: 1" = 500'

OE Range Evaluation Work Plan		Draft Final
Investigation Approach		
OE Investigation, Site 1 - EOD Range		
Date 10-01	MCAS El Toro	Figure
Project No.	EARTH  TECH	3-1
36097	A tyco INTERNATIONAL LTD. COMPANY	

SITE 1
RI/OE Range Evaluation Field Work Update

OE Range Evaluation Field Activities

- OE Specific Requirements
- Biological Monitoring-USFWS Requirements (Ongoing)
- Geophysical Survey Test Plot
- Northern/Southern EOD Ranges
 - Interpreted Geophysical Anomalies/Reacquired 59 Locations
 - Trench/Pothole for OE Characterization (Ongoing)
- Buffer Zone
 - Located Radials
 - Completed Surface Survey of Radials
 - Geophysical Survey of Radials (Jan. 30-Feb. 5, '02)
 - Trench/Pothole (if necessary)

SITE 1
RI/OE Range Evaluation Field Work Update

OE Range Evaluation Field Activities

- Perimeter
 - Completed Surface Survey Inside & Outside of Fence
 - Completed Geophysical Survey Inside of Fence
 - Conduct Geophysical Survey of Radials (Feb. 1-6, '02)
 - Conduct Geophysical Survey Outside Fence (if needed)
 - Trench/Pothole Anomalies (if found)

SITE 1
RI/OE Range Evaluation Field Work Update

- **RI-Status of Findings**
 - Preliminary Groundwater Perchlorate Results consistent with historic data
 - Awaiting Laboratory Results for Soil and Groundwater Analyses

SITE 1
RI/OE Range Evaluation Field Work Update

- **OE Evaluation-Status of Findings**
 - Kickouts present as OE Scrap
 - Mixed OE Scrap and Scrap found in Trenches/Potholes

MCAS EL TORO RAB MEETING

Pre-Design Investigation

IRP Site 3 and 5

And

Removal Site Evaluation

Anomaly Area 3

January 30, 2002

Presented By
Crispin Wanyoike
Earth Tech Inc.

IRP Site 5 Perimeter Road Landfill

• BACKGROUND

- Located along the southern station boundary and north of Perimeter Road
- Landfill was active from approximately 1955 through the late 1960s
- Land operated as a cut and fill operation handling predominantly municipal type wastes and other wastes consistent with station operations
- The landfill is long and narrow approximately 1200 feet long and 100 feet wide



IRP Site Locations

Date: 01-02	Former MCAS El Toro	Figure
Project No. 29307	EARTH  TECH	2-1
A tyco INTERNATIONAL LTD. COMPANY		

IRP Site 3 Original Station Landfill

- **BACKGROUND**

- Located on the eastern portion of the station between North Marine Way and Irvine Blvd.
- The landfill encompasses approximately 11 acres with two of the operational landfill areas bisected by Agua Chinon Wash.
- The landfill was operational from approximately 1943 until 1955
- Land operated as a cut and fill operation handling predominantly municipal type wastes and other wastes consistent with station operations

Pre-Design Investigation IRP Sites 3 and 5

- **Previous Investigations**

- Both landfills identified during the Initial Assessment Study conducted in 1986
- Landfills investigated during the Phase I and II Remedial Investigations between 1993 to 1997
- Feasibility Studies to evaluate remedial alternatives completed 1997
- Proposed Plan issued 1998
- Draft Record of Decision Issued March 1999
- Radiological Survey conducted between 2000 through 2001

Pre-Design Investigation

IRP Sites 3 and 5

Previous Investigations Continued

- **Aerial Photograph Anomaly (APHO) Evaluation**
 - Identified two additional areas of concern contiguous with IRP Site 5
 - APHO 46
 - » Located north of Site 5 where uncontrolled disposal may have occurred.
 - » A site inspection and a geophysical survey identified only one area with near surface debris.
 - » Following discussions with regulatory agencies a decision to handle the near surface debris as part of the Site 5 Remedy was made.

Pre-Design Investigation

IRP Sites 3 and 5

Previous Investigations Continued

- **Aerial Photograph Anomaly (APHO) Evaluation**
 - Identified two additional areas of concern contiguous with IRP Site 5
 - MSCR2
 - » Identified in the Environmental Baseline Survey as a possible landfill
 - » Area was partially investigated as part of the APHO 46 geophysical survey
 - » Additional investigation required to assess if refuse had been disposed in this area

Pre-Design Investigation IRP Sites 3 and 5

Previous Investigations Continued

- **Aerial Photograph Anomaly (APHO) Evaluation**
 - **Anomaly Area 3**
 - Located in an area near base housing where extraction/quarrying had occurred.
 - Excavation was filled predominantly with construction debris, including construction debris from the construction activities associated with the Investigation Derived Waste Handling Management Area at IRP Site 3
 - Evaluation of the types of refuse placed is required
 - Following discussions with regulatory agencies and with their concurrence, Anomaly Area 3 will be administratively handled (CERCLA Documentation) as part of IRP Site 3. Reasons for adopting this approach include:
 - » Soil Remedy at Site 3 has already been identified in the draft ROD
 - » Expedite the site evaluation and the response action selection and implementation process

Pre-Design Investigation IRP Sites 3 and 5

- **Selected Remedy**
 - A single-barrier cover system consisting of a 2-foot-thick foundation layer, a barrier layer made of flexible membrane liner (FML), and a 2-foot-thick soil layer to support vegetation
 - Erosion control features to control surface water flow and protect the integrity of the cap
 - Land-use restrictions in the form of lease conditions (if the property is leased) or restrictive covenants (if the property is transferred by deed) to protect the landfill cover and assure that contact with landfill materials does not occur
 - Monitoring of landfill vapor, leachate, and groundwater
 - Maintenance of the cap, security measures, erosion-control features, monitoring equipment, survey benchmark

Pre-Design Investigation IRP Sites 3 and 5









- Investigation Objectives
 - Confirm current landfill boundaries
 - Conduct trenching along existing landfill boundaries to verify waste placement boundaries
 - Assess geotechnical/engineering design parameters
 - Collect samples of existing cover soil and surrounding areas to evaluate geotechnical engineering properties for use in the remedial design
 - Evaluate the need for a landfill gas collection system
 - Install landfill gas monitoring wells along the landfill perimeter
 - Collect samples to assess if landfill gas is migrating past the current landfill boundaries

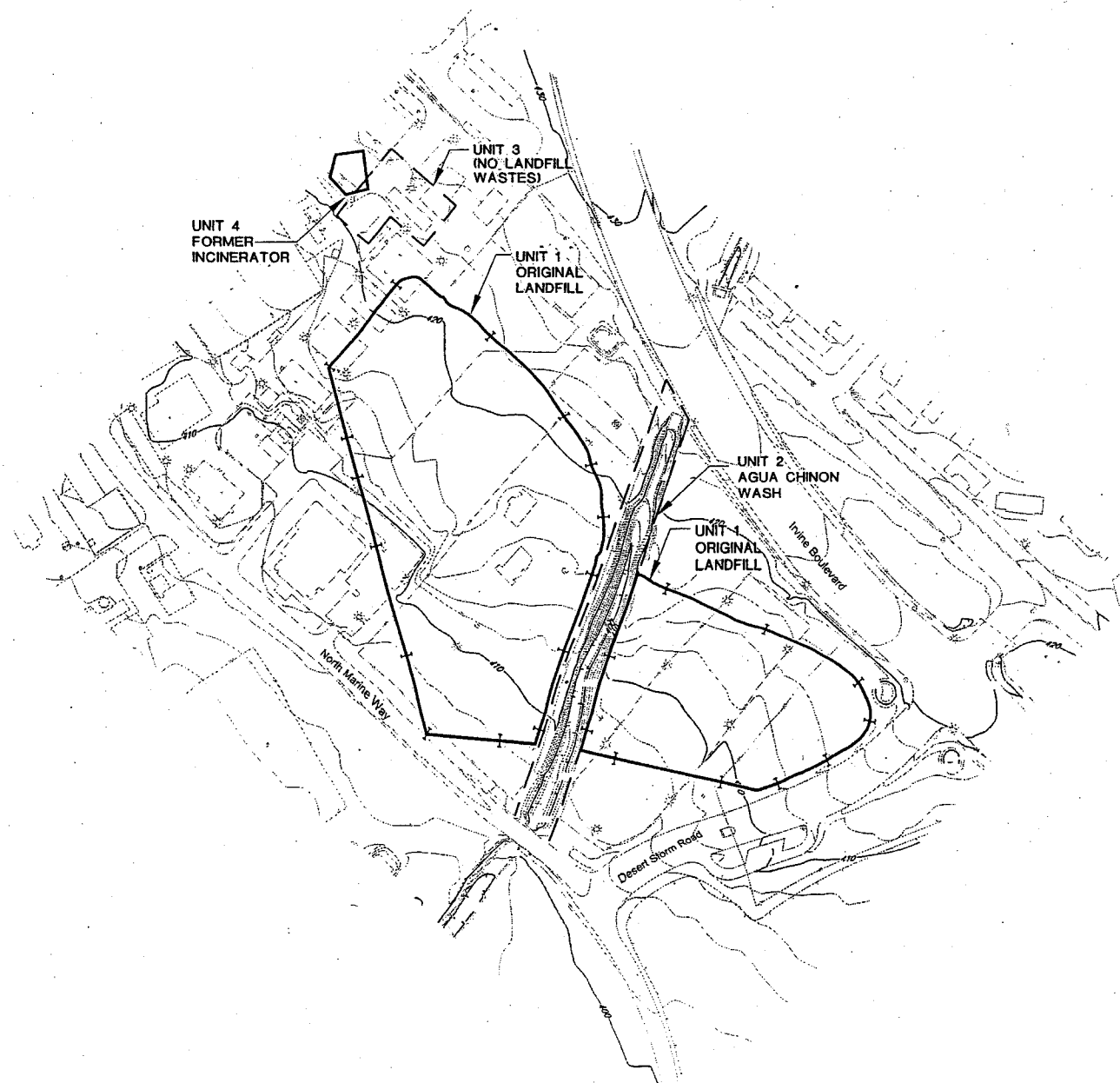
Pre-Design Investigation IRP Sites 3 and 5

- Investigation Objectives
- APHO 46
 - Assess possible impact due to near surface debris
 - Soil gas survey and soil sampling
- MSCR2
 - Conduct geophysical survey on remaining portions of MSCR2
 - Conduct an evaluation of any anomalies identified
 - Trenching, soil gas survey and soil sampling

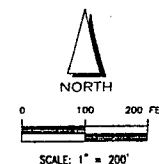
SOURCE OF MAP INFORMATION
RI REPORT: BMI 1996d

LEGEND


-  BUILDING
-  IMPROVED ROADS
-  FENCE
-  ELEVATION CONTOURS (10' INTERVAL)
-  ELEVATION CONTOURS (2' INTERVAL)
-  STREETLIGHT
-  LANDFILL BOUNDARY
-  PROPOSED TRENCH LOCATIONS



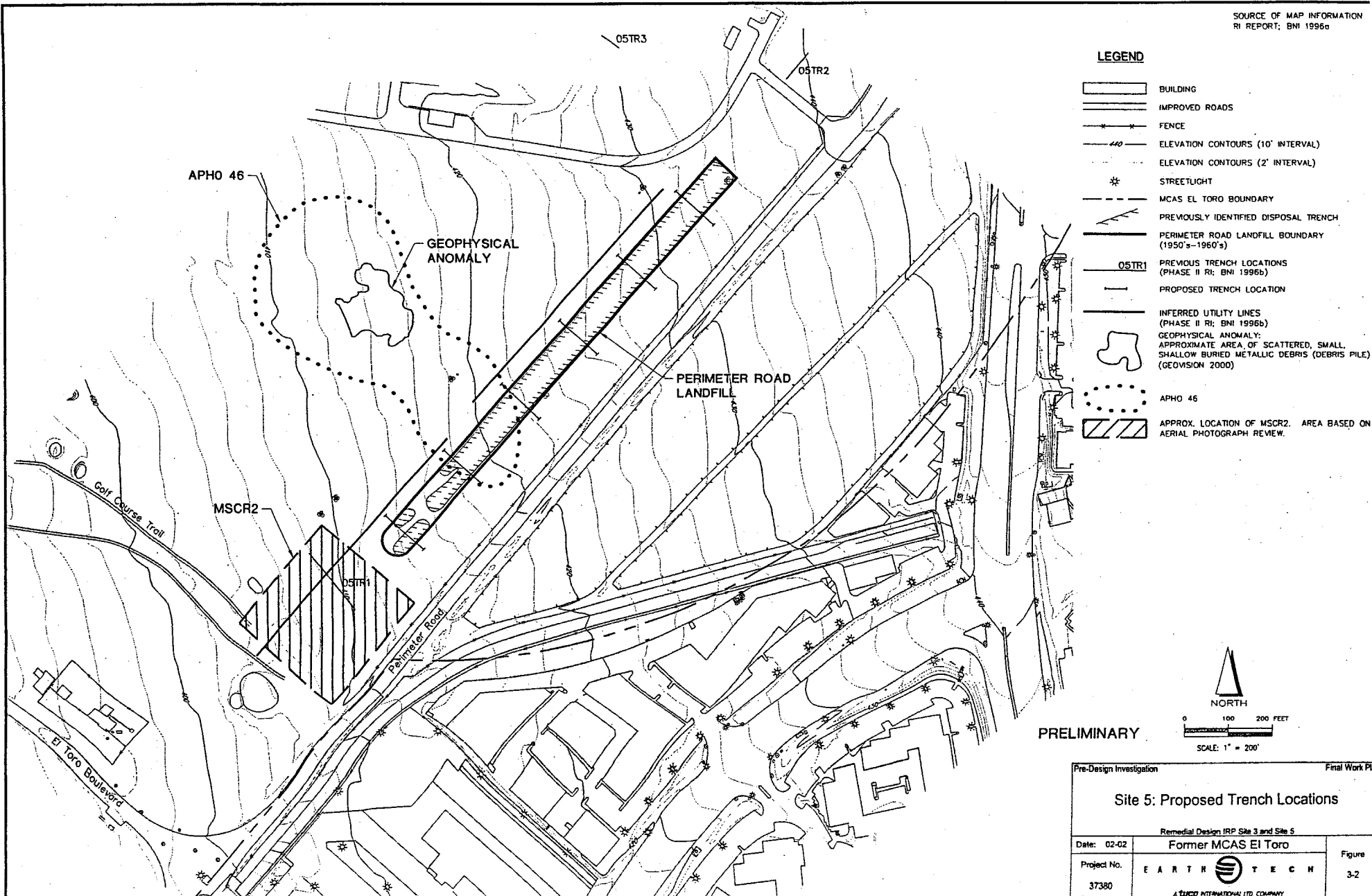
PRELIMINARY



Site 3: Proposed Trench Location

Pre-Design Investigation		Final Work Plan	
Site 3: Proposed Trench Location			
Remedial Design IRP Site 3 and Site 5			
Date: 02-02	MCAS El Toro		Figure 3-1
Project No. 37380	EARTH  TECH A TYCO INTERNATIONAL LTD COMPANY		

SOURCE OF MAP INFORMATION
RI REPORT; BNI 1996a



Pre-Design Investigation IRP Sites 3 and 5

- Draft Work Plan – issued August 2000
- Final Work Plan - February 2002
- BCT Review - March 2002
- Field Work - April- July 2002
- Draft Technical Memorandum - November 2002

Removal Site Evaluation Anomaly Area 3

• Background

- Anomaly Area 3 encompasses an area of approximately 9 acres and is located in the northwestern section of the MCAS El Toro facility near Pusan Way, adjacent to the Agua Chinon Wash
- Miscellaneous refuse Anomaly Area 3 refers to seven aerial photograph (APHO) anomaly areas identified during a review of historical aerial photographs taken during the period from 1946 through 1992 (SAIC 1993)
- Topographic maps indicate that refuse may be approximately 30 feet thick
- Navy anticipates that a removal action will be required for this site

Removal Site Evaluation Anomaly Area 3

- **Previous Investigations**

- Literature Review and Site Inspection Conducted –1999
- Preliminary Site Investigation – 1999-2000
 - Geophysical Survey
 - Installation of vadose zone and groundwater monitoring wells
 - Exploratory trenching and soil sampling
 - Groundwater sampling
 - Results submitted to BCT in the form of a Technical Information Package
- Radiological Survey
 - Field Survey phase completed September 2001 and the release report is being prepared.

Removal Site Evaluation Anomaly Area 3

- **Investigation Objectives**

- Collect of soil vapor, soil, groundwater, and surface water/sediment samples to evaluate the impact, if any, due to waste placement activities
- Confirm of the lateral limits of the waste placement
- Evaluate of human health and ecological risk
- Collect of soil samples to conduct a geotechnical assessment of the existing soil cover and provide data for the design of a cover system, if required

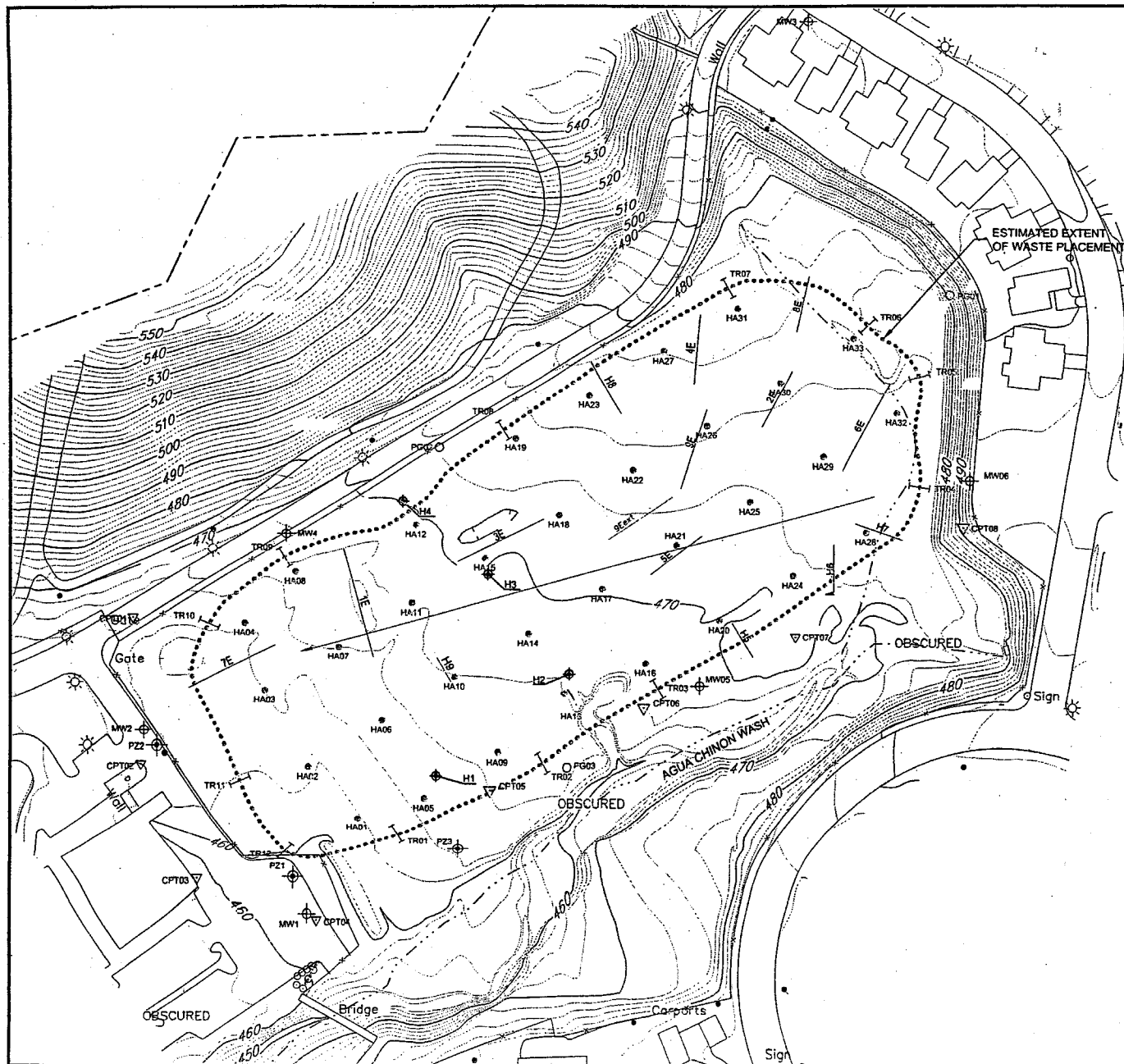
Removal Site Evaluation Anomaly Area 3

- **Investigation/Sampling Activities**
 - Installation and sampling of perimeter vapor monitoring wells
 - Installation of additional groundwater monitoring wells and sampling of existing wells
 - A CPT survey
 - Air sampling (integrated and ambient) to evaluate the impact of the waste on air quality
 - Soil gas (shallow and subsurface) sampling to verify whether soil gas hot spots are present and to evaluate the need for a landfill gas collection system
 - Soil sampling (surface) and analysis for COPCs to aid in the evaluation of human-health risk
 - Geotechnical soil testing to evaluate the soil index and engineering properties of the existing cover soil

Removal Site Evaluation Anomaly Area 3

- **Schedule**
 - Draft Work Plan – issued January 2002
 - BCT Review - February 2002
 - Final Work Plan – March 2002
 - Field Work - March - July 2002
 - Draft Removal Site Evaluation Report - January 2003

M:\Project\37380 (CTO-78)\CAD\Figures\Anomaly Area 3\Work Plan\Fig 4.3 Pro LocRa.dwg, 01/29/2002 05:34:05 PM



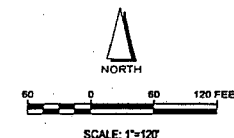
TOPOGRAPHY COMPILED BY
PHOTOGRAMMETRIC METHOD FROM AERIAL
PHOTOGRAPHY DATED NOVEMBER 8, 1990
BY AIRBORNE SYSTEMS, INC.

LEGEND

- 450 MINOR SURFACE ELEVATION: 2-FOOT INTERVALS
- MAJOR SURFACE ELEVATION: 10-FOOT INTERVALS
- MCAS EL TORO BOUNDARY
- EXISTING STREAM OR WASH
- ESTIMATED EXTENT OF WASTE PLACEMENT
- GENERAL GROUNDWATER DIRECTION
- HA31 PROPOSED SOIL/SOIL VAPOR SAMPLING LOCATIONS
- TR05 PROPOSED TRENCH LOCATION
- MW06 PROPOSED GROUNDWATER MONITORING WELL LOCATION
- CPT01 PROPOSED CONE PENETROMETER TEST LOCATION
- PG01 PROPOSED PERIMETER GAS MONITORING WELL LOCATION
- MW4 EXISTING GROUNDWATER MONITORING WELL
- PZ3 EXISTING VADOSE ZONE WELL
- 5E PREVIOUS TRENCH LOCATION
- H4 PREVIOUS TRENCH/POTHOLE LOCATION

NOTE:

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL.
2. SURFACE WATER WILL BE COLLECTED FROM AGUA CHINON WASH AT ONE LOCATION UPGRADIENT AND ONE LOCATION DOWNGRADIENT FROM ANOMALY AREA 3, TO BE DETERMINED DURING OBSERVED SURFACE WATER FLOW.



RSE Work Plan		Draft
Proposed Sampling Locations		
Removal Site Evaluation for Anomaly Area 3		
Date: 01-02	MCAS El Toro	
Project No. 37380	EARTH TECH A TUCON INTERNATIONAL LTD. COMPANY	
		Figure 4-3

El Toro Funding

James R. Sheetz, PE

1

Introduction

- Update on funding
- Jim Sheetz, Business Line Team Leader, Marine Corps Team, SWDIV NAV FAC, San Diego
- Responsible for environmental funds for BRAC work

2

Presentation Topics

- Summary of recent BRAC funding
- FY02 funding and projects
- FY03 funding request
- Cost to complete

3

Recent BRAC Funding

- FY99 \$9.3M IR \$2.2M compliance
- FY00 \$4.0M IR \$1.8M compliance
- FY01 \$9.9M IR \$1.0M compliance

4

FY02 Funding

- \$11M IR funds received from NAVFAC
- \$7.4M IR funds due in from Marine Corps
- \$18.4M IR funds total for FY02
- \$3.3M compliance funds budgeted by Marine Corps
- \$1.1M additional compliance funds requested by BRAC

5

FY02 IR Projects

- Remedial design VOC Source
- Remedial design contaminated groundwater plume
- Radiological remediation
- Anomaly Area 3 engineering evaluation and cost analyses
- Groundwater treatability study
- Remedial action transformer storage area
- Remedial action Magazine Road landfill

6

FY02 IR Projects (cont.)

- Remedial action support (test pad)
- Remedial action Communication Station Landfill
- Remedial design DRMO Storage Yard
- Remedial design sludge drying beds
- Feasibility study and proposed plan Crash Crew Pit No. 2
- Base-wide groundwater monitoring
- Community relations support services

7

FY03 Funding Request

- \$20.5M IR funds
- \$0.6M compliance funds
- \$21.1M total FY03 request

8

Cost to Complete

- \$73.3M IR funds
- \$12.9M compliance
- \$86.2M total cost to complete includes FY02

9

Funding Outlook

- Navy and Marine Corps have met funding obligations
- FY02 IR funding is greater than last three years



EPA

Background Perchlorate Information for Arizona, California and Nevada

The U.S. Environmental Protection Agency released a draft toxicity assessment today (Fri. Jan. 18) entitled, "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization," that assesses risks posed by perchlorate, a chemical primarily used in solid rocket fuel.

The draft assessment has been released for public review. It proposes a new draft reference dose based on studies of toxicity of perchlorate. The agency's current reference dose, equates to approximately 4-18 parts per billion perchlorate in drinking water. The new draft reference ~~dose~~^{dose} equates to approximately 1 ppb perchlorate in drinking water. This is not a drinking water standard, but it is the first step in a public process to determine if the agency should set a federal drinking water standard for this contaminant.

Arizona has set a preliminary goal of 14 ppb for drinking water, California and Nevada's action level is 18 ppb in drinking water.

Perchlorate can affect how the thyroid gland functions. In children, the thyroid plays a major role in proper development, including the development of brain cells. Thyroid disorders in expectant mothers may result in effects to the developing fetus and newborn. Effects may include abnormal motor activity, decreased learning capability and other behavioral differences that can be tested and observed in animals.

Perchlorate is listed on the agency's unregulated contaminant list, and water systems have been required to test for the chemical since 2000. Colorado River supplies to Los Angeles, San Diego, Calif. and Phoenix Ariz. show perchlorate levels at five to six ppb, and in Las Vegas perchlorate levels have been measured at between 5-24 ppb.

Sensitive populations, like pregnant women, children and people who have health problems or compromised thyroid conditions, should follow the advice of their health care provider regarding the amount and type of liquids, including water that should be consumed. Since perchlorate may affect thyroid function, pregnant women may wish to ask their health care provider about the usefulness of thyroid hormone monitoring during various stages of their pregnancy and monitoring of children during various stages of growth and development.

This is a national study prepared by the NCEA through EPA's Office of Research and Development. The draft assessment will be available at <http://www.epa.gov/ncea> under "what's new". EPA will also hold an external scientific peer review workshop to review the assessment and to accept additional comments in Sacramento, Calif., on March 5-6. This meeting will be open to the public, and more information is available at <http://www.epa.gov/fedrgstr/> under the heading for Jan. 2.



PERCHLORATE

EPA has released for public review and comment its revised draft toxicity assessment on perchlorate, which is the primary ingredient of solid rocket propellant. The draft assessment, entitled "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization," is available at www.epa.gov/ncea under "what's new". The Agency will also hold a peer review workshop open to the public on this draft assessment on March 5th and 6th 2002, in Sacramento, California. This meeting will be open to the public, and more information is available at www.epa.gov/fedrgstr under the heading for Jan. 2. Following this opportunity for public and independent scientific input, EPA expects to finalize the document by late summer, 2002.

When finalized, this draft assessment will be an important update to the Agency's health and ecological assessment for potential risks resulting from exposure to perchlorate through drinking water and other sources. The revised human health and ecological risk estimates found in this draft document continue to undergo scientific review and analysis both within EPA and by the external scientific community. As with any draft EPA assessment containing a quantitative risk value, risk estimates in this review document are preliminary. Therefore, it is premature at this stage to interpret risk estimates in this draft document as final EPA conclusions on which the Agency could take risk management action. The draft risk estimate is not a drinking water standard, but is the first step in a lengthy process to determine if the agency should set a federal drinking water standard for this contaminant.

EPA, other federal agencies, states, water suppliers and industry are already addressing perchlorate contamination through a number of activities. EPA is monitoring for perchlorate in drinking water through the Unregulated Contaminant Monitoring Program and the U.S. Geological Survey is monitoring for perchlorate in surface water. In California, Superfund sites are employing new technologies to remove perchlorate from contaminated water. The Ground Water Remediations Technologies Analysis Center is collecting data on perchlorate treatment studies to provide a stronger scientific understanding of the effectiveness of perchlorate treatment.

The draft toxicity assessment provides additional scientific insight into the potential risks posed by perchlorate and ways to reduce those risks. Sensitive populations such as pregnant women should follow the advice of their health care provider regarding the amount

and type of liquids, including water to be consumed. Concerns and questions about perchlorate and the safety of tap water can be addressed by contacting local water utilities. Contact EPA's Safe Drinking Water Hotline at 1-800-426-4791 for general information on drinking water issues.

Frequently Asked Questions

What is Perchlorate?

Perchlorate is both a naturally occurring and man-made chemical. Most of the perchlorate manufactured in the United States is used as the primary ingredient of solid rocket propellant. Wastes from the manufacture and improper disposal of perchlorate-containing chemicals are increasingly being discovered in soil and water.

How Can Perchlorate Affect Human Health?

Perchlorate interferes with iodide uptake into the thyroid gland. Because iodide is an essential component of thyroid hormones, perchlorate disrupts how the thyroid functions. In adults, the thyroid helps to regulate metabolism. In children, the thyroid plays a major role in proper development in addition to metabolism. Impairment of thyroid function in expectant mothers may impact the fetus and newborn and result in effects including changes in behavior, delayed development and decreased learning capability. Changes in thyroid hormone levels may also result in thyroid gland tumors. EPA's draft analysis of perchlorate toxicity is that perchlorate's disruption of iodide uptake is the key event leading to changes in development or tumor formation.

What are the Preliminary Conclusions of the Draft Toxicity Assessment?

The EPA draft assessment concludes that the potential human health risks of perchlorate exposures include effects on the developing nervous system and thyroid tumors. The draft assessment includes a draft reference dose (RfD) that is intended to be protective for both types of effects. It is based on early events that could potentially result in these effects, and factors to account for sensitive populations, the nature of the effects, and data gaps were used. The draft RfD is 0.00003 milligrams per kilogram per day (mg/kg/day). The RfD is defined as an estimate, with uncertainty spanning perhaps an order of magnitude, of a daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of adverse effects over a lifetime. As with any EPA draft assessment document containing a quantitative risk value, that risk value is also draft and should not at that stage be construed to represent EPA policy. Thus, the draft RfD for perchlorate is still undergoing science review and deliberations both by the external scientific community and within the Agency.

The assessment provides a hypothetical conversion of the draft RfD to a drinking water equivalent level (DWEL), assuming factors of 70 kilogram (kg) body weight and 2 liter (L) of water consumption per day. The converted draft estimate would be 1 microgram per liter (ug/L) or 1 part per billion (ppb). If the Agency were to make a determination to regulate perchlorate, the RfD along with other considerations would factor into the final value.

Does perchlorate cause cancer?

Perchlorate is associated with disruption of thyroid function which can potentially lead to thyroid tumor formation. This draft toxicity assessment accounts for both developmental and tumor formation effects.

Does My Water Contain Perchlorate?

There have been confirmed perchlorate releases in at least 20 states throughout the United States. Additional information and maps detailing those sites are available in Chapter 1 of the draft of the "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization." EPA, other federal agencies, states, water suppliers and industry are already actively addressing perchlorate contamination through monitoring for perchlorate in drinking water and surface water. The full extent of perchlorate contamination is not known at this time.

What Is Being Done about Perchlorate?

The draft toxicity assessment will undergo peer review, and once it is finalized, the reference dose will be used in EPA's ongoing efforts to address perchlorate problems. EPA's draft reference dose represents a preliminary estimate of a protective health level and is not a drinking water standard. In the future, EPA may issue a Health Advisory that will provide information on protective levels for drinking water. This is one step in the process of developing a broader response to perchlorate including, for example, technical guidance, possible regulations and additional health information. A federal drinking water regulation for perchlorate, if ultimately developed, could take several years.

In 1998, perchlorate was placed on EPA's Contaminant Candidate List for consideration for possible regulation. In 1999, EPA required drinking water monitoring for perchlorate under the Unregulated Contaminant Monitoring Rule (UCMR). Under the UCMR, all large public water systems and a representative sample of small public water systems are required to monitor for perchlorate over the next two years to determine whether the public is exposed to perchlorate in drinking water nationwide.

How is perchlorate removed from water?

Several types of treatment systems designed to reduce perchlorate

concentrations are operating around the United States, reducing perchlorate to below the 4 ppb quantitation level. Biological treatment and ion (anion) exchange systems are among the technologies that are being used, with additional treatment technologies under development.

Many other perchlorate studies have been completed during the last several years. A May 2000 summary of 65 perchlorate treatment studies is available online at www.frtr.gov/perchlorate EXTERNAL (click on "Treatment Technology," then look for "GWRTAC Technology Summary"). The summary report was prepared by the Ground-Water Remediation Technologies Analysis Center. Most of the projects described in the report are bench-scale and pilot-scale demonstrations of water treatment technologies, although several entries describe full-scale systems and soil treatment methods. Most of the projects employ biological treatment methods or ion (anion) exchange technology, although reverse osmosis, nanofiltration, granular activated carbon, and chemical reduction are also discussed. Results of federally-funded perchlorate treatment research managed by the American Water Works Research Foundation (AWWARF) are also becoming available (see <http://www.awwarf.com/research/spperch.asp> EXTERNAL)

What are the next steps to developing a final toxicity assessment?

EPA will accept comments on the draft toxicity assessment document until March 6, 2002. Comments received by February 19, 2002, will be made available at the peer review workshop. This peer review will provide an independent review of the scientific information and interpretation used in the draft document. Please contact the Eastern Research Group (ERG), an EPA contractor, for more information on the comment process at (781) 674-7272.

As part of the review, an external peer review workshop will be held in Sacramento, CA on March 5 and 6, 2002. The peer review meeting is open to the public and an opportunity will be provided for oral public comment. The workshop is being organized and convened by ERG. In order to accommodate interested parties, please register for the workshop either by e-mail (meetings@erg.com) or by calling the ERG registration line at (781) 674-7374. The deadline for registration is February 25, 2002.

Is perchlorate-contaminated water safe to drink?

EPA's draft toxicity assessment is preliminary and thus, it is difficult to make definitive recommendations at this stage. It is also important to recognize that estimates contained in this draft assessment are designed to be conservative. In other words, there are adjustment factors built into this estimate to help account for uncertainties in the underlying data and information used. Other factors that influence the answer to this question include how much water is consumed,

the degree of perchlorate contamination and the health status of the consumer.

Can pregnant women and children drink the water?

Sensitive populations, like pregnant women, children and people who have health problems or compromised thyroid conditions, should follow the advice of their health care provider regarding the amount and type of liquids, including water that should be consumed.

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This page was updated 01/18/02 07:21:14
<http://www.epa.gov/safewater/ccl/perchlor/perchlo.html>

025875

Draft version Jan. 14, 2002: targeted release TBD

**DRAFT PERCHLORATE RISK ASSESSMENT RELEASED FOR REVIEW;
PEER REVIEW MEETING SCHEDULED**

David Deegan, 202-564-7839

The latest step in an ongoing effort to assess the human health and ecotoxicological risks posed by ammonium perchlorate, a component of solid rocket fuel, has been reached. A revised draft risk assessment was released for public review, and comments will be accepted until March 6. EPA will also hold an external scientific peer review workshop to review the assessment and to accept additional comments in Sacramento, Calif., on March 5-6. This meeting will be open to the public, and more information is available at <http://www.epa.gov/fedrgstr/> under the heading for Jan. 2. The efforts to characterize potential risks from perchlorate contamination and the development of this revised external review draft have followed an open public process, highlighted by the working partnership of the Interagency Perchlorate Steering Committee, which is co-chaired by EPA and the U.S. Department of Defense, and which currently is comprised of representatives from more than 23 state, federal and tribal agencies. EPA first released a preliminary risk assessment for perchlorate in 1998, and recommendations for additional studies and analyses were made at a 1999 scientific peer review. The external review draft of the revised document, *Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization* incorporates results from extensive laboratory and field studies, in addition to responding to those recommendations. The draft assessment is available at <http://www.epa.gov/ncea> under "what's new". After comments derived from the current public comment period are addressed, the final assessment document will undergo Agency consensus clearance for inclusion on EPA's Integrated Risk Information System (IRIS). The human health and ecological risk estimates could be used in the future to support development of a health advisory or a possible drinking water regulation, and for consideration in cleanup decisions at federal facilities or other contaminated sites. These decisions would be subject to the legal, regulatory, or policy requirements associated with those programs.



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Perchlorate's Drinking Water Action Level and Regulations

Last Update: January 18, 2002

Actions When Action Level Is Exceeded | Basis for the Action Level | References

Perchlorate is among the unregulated chemicals requiring monitoring (Title 22, California Code of Regulations §64450). It is "unregulated" because it has no drinking water standard, also referred to as a maximum contaminant level (MCL).

In the absence of an MCL, DHS uses an advisory action level (AL) of 4 micrograms per liter ($\mu\text{g/L}$) to protect drinking water consumers from the adverse health effects of perchlorate, which targets the thyroid gland. The 4- $\mu\text{g/L}$ AL, established in January 2002, replaced the 18- $\mu\text{g/L}$ AL that was used from 1997 through 2001 (see basis for the perchlorate action level).

To propose an MCL for perchlorate, DHS needs a risk assessment. In California such an assessment is a public health goal (PHG)—the contaminant's concentration in drinking water that does not pose any significant risk to health—which is established by the Office of Environmental Health Hazard Assessment (OEHHA). Health and Safety Code §116365(a) requires DHS, while placing primary emphasis on the protection of public health, to establish a contaminant's MCL at a level as close as is technically and economically feasible to its PHG. OEHHA's draft perchlorate PHG is expected in 2002.

Actions When Action Level Is Exceeded

Certain requirements apply when perchlorate in drinking water exceeds the action level (see follow-up monitoring recommendations):

- **Governing Agency Notification:** If an action level is exceeded, a public water system is required to notify the local governing agency (*i.e.*, the city council or county board of supervisors) within 30 days, even if the well is closed (Health and Safety Code §116455).

In addition, DHS also recommends the following actions by public water systems (see follow-up monitoring recommendations):

- **Consumer Notice:** If the perchlorate exceeds 4 $\mu\text{g/L}$, the public water system should inform its customers and consumers as soon as is feasible about perchlorate's presence and its potential for adverse health effects. Whenever such a public "right-to-know" notice occurs as a result of an action level exceedance, the notice should be provided to customers and to the water-consuming population in the affected area that would not directly receive such information, including renters, workers and students.
- **Source Removal:** If the perchlorate exceeds 40 $\mu\text{g/L}$, the system should remove the drinking water source from service. [For "non-carcinogenic" contaminants, DHS recommends source removal if contamination exceeds 10 times the action level.]

Basis for the Action Level

1997 through 2001: Perchlorate Action Level = 18 $\mu\text{g/L}$

dhs

Following its **perchlorate findings in 1997**, DHS informed drinking water utilities that US EPA had determined a provisional reference dose (RfD) for perchlorate, as part of its Superfund activities (US EPA, 1992, 1995). DHS, in cooperation with OEHHA, reviewed US EPA's perchlorate evaluations and established a drinking water action level of 18 $\mu\text{g/L}$, the upper end of the range resulting from US EPA's provisional RfD.

DISCUSSION: Standard exposure assumptions allowed calculation of a "safe" drinking water concentration from the EPA's provisional RfD and result in a 4- to 18- $\mu\text{g/L}$ range for the adult and a corresponding 1- to 5- $\mu\text{g/L}$ for the child (**Table 1**). Comparing these values with the No Observable Adverse Effect Level (NOAEL) allows an estimate of the "safety" provided by the AL. The estimated NOAEL of 0.14 mg/kg/day corresponds to a drinking water concentration of 4,900 $\mu\text{g/L}$ for the adult and 1,400 $\mu\text{g/L}$ for the child. These concentrations are approximately 270 and 80 times the 18- $\mu\text{g/L}$ AL. In other words, exposures 270 and 80 times the 18- $\mu\text{g/L}$ AL would be anticipated to have no adverse health effect.

In 1998, calculations based upon the US EPA draft RfD suggest protective concentrations of 32 and 10 $\mu\text{g/L}$ for the adult and child, respectively. The estimated NOAEL of 0.03 mg/kg/day (=LOAEL of 0.1 mg/kg/day divided by 3) corresponds to a drinking water concentration of 2,100 $\mu\text{g/L}$ for the adult and 300 $\mu\text{g/L}$ for the child. These concentrations are 120 and 20 times the 18- $\mu\text{g/L}$ AL, and exposures at 120 and 20 times the AL would be anticipated to have no adverse health effect.

2002: Perchlorate Action Level = 4 $\mu\text{g/L}$

Calculations based upon US EPA's draft RfD (US EPA, 2002) suggested protective concentrations of 1 and 0.3 $\mu\text{g/L}$ for the adult and child, respectively. The estimated NOAEL of 0.001 mg/kg/day (=LOAEL of 0.01 mg/kg/day divided by 10) corresponds to a drinking water concentration of 70 $\mu\text{g/L}$ for the adult and 10 $\mu\text{g/L}$ for the child.

Based on this evaluation, DHS concluded that its AL needed to be revised downward. Accordingly, DHS reduced the perchlorate AL to 4 $\mu\text{g/L}$, the same level as the lower of the 4- to 18- $\mu\text{g/L}$ range that provided the prior AL.

The 4- $\mu\text{g/L}$ AL also corresponds to the current detection limit for purposes of reporting (DLR). The DLR is the level at which DHS is confident about the quantitation of the contaminant in drinking water. If analytical methods improve and the DLR can be lowered, DHS may reduce the AL further prior to development of a perchlorate MCL.

Table 1. Comparison of US EPA's evaluations of perchlorate.

Parameter	US EPA (1992)	US EPA (1995)	US EPA (1998) draft	US EPA (2002) draft
No or lowest observed adverse effect level (NOAEL or LOAEL) Units = mg/kg/day	0.14	0.14	0.1	0.01
Uncertainty Factor (UF) (product of the following factors, e.g., 10 x 10 x 10 x 1)	1,000	300-1,000	100	300
• Factor to account for intrahuman variability within people	10	10	3	3
• Factor to account for a study of short duration, instead of a long-term "chronic" study	10	10	1	3
• Factor to account for deficiencies in data available on the effects of perchlorate	10	3-10	3	3
• Factor to account for interspecies extrapolation	1	1	3	3
• Factor for use of minimal LOAEL rather than NOAEL	--	--	3	10
"Provisional" Reference Dose (RfD) = NOAEL/UF. or LOAEL/UF Units = mg/kg/day	0.0001	0.0001-0.0005	0.0009	0.00003
Corresponding drinking water concentration; assumptions = 2 liters/day and 70-kg body weight for adult.	4 $\mu\text{g/L}$	4-18 $\mu\text{g/L}$	32 $\mu\text{g/L}$	1 $\mu\text{g/L}$
Corresponding drinking water concentration; assumptions = 1 liter/day and 10-kg body weight for child.	1 $\mu\text{g/L}$	1-5 $\mu\text{g/L}$	10 $\mu\text{g/L}$	0.3 $\mu\text{g/L}$

References

Stanbury, J.B. and J.B. Wyngaarden, 1952. Effect of perchlorate on the human thyroid gland. *Metabolism* 1: 533-539

US EPA, 1992, Provisional Non-cancer and Cancer Toxicity Values for Potassium Perchlorate (CASRN 7778-74-7) (Aerojet General Corp./CA), Memorandum from Joan S. Dollarhide, Superfund Health Risk Technical Support Center, Environmental Criteria and Assessment Office, Office of Research and Development, to Dan Stralka, US EPA Region IX.

US EPA, 1995, Correspondence from Joan S. Dollarhide, National Center for Environmental Assessment, Office of Research and Development, to Mike Girrard, Chairman, Perchlorate Study Group.

US EPA, 1998, *Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization Based on Emerging Information*, External Review Draft, NCEA-1-0503, National Center for Environmental Assessment (NCEA), December 31, 1998. [Go to [NCEA's perchlorate reports](#)]

US EPA, 2002, *Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization*, External Review Draft, NCEA-1-0503, January 16, 2002. [Go to [NCEA's perchlorate reports](#)]

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Department of Toxic Substances Control



Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630

Gray Davis
Governor

January 14, 2002

Mr. Dean Gould
BRAC Environmental Coordinator
Marine Corps Air Station El Toro
Base Realignment and Closure
P.O. Box 51718
Irvine, California 92619-1718

REMEDIAL DESIGN (60 PERCENT SUBMITTAL), INSTALLATION RESTORATION
PROGRAM SITES 2 AND 17, MARINE CORPS AIR STATION (MCAS) EL TORO

Dear Mr. Gould:

The Department of Toxic Substances Control (DTSC) reviewed the above document dated November 2001 and received by this office on November 19, 2001. The 60 percent Remedial Design (RD) submittal addresses the remedial action for Sites 2 and 17 as presented in the *Final Interim Record of Decision [ROD], Operable Unit 2B, Landfill Sites 2 and 17, Marine Corps Air Station, El Toro, California* (Bechtel National Inc., April 2000).

DTSC appreciates the opportunity to review and comment on the 60 percent RD. Comments from the DTSC Engineering Services Unit are enclosed. Please contact me at (714) 484-5395 if you have any questions.

Sincerely,

Triss M. Chesney, P.E.
Remedial Project Manager
Office of Military Facilities
Southern California Branch

Enclosure

cc: See next page

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.
For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at www.dtsc.ca.gov.*



Department of Toxic Substances Control



Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Edwin F. Lowry, Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Gray Davis
Governor

MEMORANDUM

TO: Triss Chesney, P.E.
Site Mitigation
Southern California Region
Cypress

VIA: John Hart, P.E. *[Signature]*
Chief, Engineering Services Unit

FROM: Ram Ramanujam, P.E. *[Signature]*
Hazardous Substances Engineer
Engineering Services Unit

DATE: January 10, 2002

SUBJECT: 60% Remedial Design - Operable Unit 2B - Landfill Sites 2 and 17,
Marine Corps Air Station, El Toro, CA

Per your request, I have reviewed the following document:

60% Submittal Remedial Design, Operable Unit 2B, Landfill Sites 2 and 17,
Marine Corps Air Station, El Toro, CA (dated November 2001)

Based on the review my comments are as follows:

COMMENTS:

1. Section 1.6: The Report should include a typical subsurface cross section profile identifying various aquifers and the subsurface materials.
2. Section 2.1.13: The Report should include the requirements of Title 27 CCR 21750(f)(5) as the part of action-specific ARARs for the slope stability analysis.

01/10/2002 11:00 FAX 916 233 3037 DISC/SACRAMENTO

3. Section 2.1.2, Design Criteria:

. The Report should include remedial design criteria such as design earthquake, soil erosion (2 tons/acre/year) etc.,

. "Maximum allowable deformation will be held to within 1.0 to 3.0 feet using a seismic coefficient of 0.15 g". This sentence should be deleted. Seismic stability analysis should be based on the site specific conditions (design earthquake and geotechnical parameters) and not using seismic coefficient of 0.15g.

4. Section 2.3.4, Seismic hazard Evaluation, page 2-13: "The analysis will verify that satisfactory values of the computed static factor of safety (greater than 1.5) and pseudo-static factor of safety (greater than 1.0) will be met for the planned grading configuration." This sentence does not follow the requirements of Title 27 CCR 27150(f)(5). Please revise the sentence to satisfy the requirement of the regulations.

5. Section 2.3.5, Stability Deformation Analysis: See Comment No: 4.

6. Section 2.3.6, Settlement Analysis: The Report proposes six and four settlement monuments for Site 2 and 17 respectively. It should be noted that Site 2 occupies about 22 acres and Site 17 about 11 acres. The number of settlement markers are not sufficient to obtain appropriate trend for the landfill settlement. The number of settlement monuments should be increased for both Sites 2 and 17.

7. Section 2.3.7, Liquefaction Analysis: The Report should include the backup calculations for the liquefaction analysis.

8. Section 2.4.3, Erosion and Sedimentation: See Comment No: 3.

9. Section 2.5, Road Design: The Report should include the foundation criteria for the road design.

10. Section 2.7, Lysimeters: The Report should include the location of the lysimeters.

11. Section 2.11, Closure Construction Specification: Construction specifications should include settlement monuments, seeding, erosion control mat, aggregate base roads, lysimeters and drainage ditches.

12. Section 3, Post-Construction Monitoring and Maintenance: The Post-Construction monitoring and maintenance should include an event after an earthquake.

01/10/2002 11:00 FAX 916 255 6662 DISC/SACRAMENTO 0004

13. Table 3-1, Post-Closure Monitoring: The frequency of lysimeters should be revised (quarterly for the first year and semiannually for the next 4 years).

14. Table 3-1, Post-Closure Monitoring: The frequency of monitoring for the settlement monuments should be revised (quarterly until settled and annually thereafter).

15. Section 3.3, Settlement Monuments: See Comment No: 6.

16. Section 3.4: Inspection and Maintenance: "Personnel will routinely inspect the over system and all drainage structures for erosion, cracks, settlement and movement, vegetation growth, and damage." A Site inspection should be conducted by a professional Civil Engineer.

17. Appendices should include cover erosion calculations to satisfy the U.S. EPA guidance document (EPA/625/4-91/015, May 1991).

18. Appendix A, 60% Design Drawings: Sheet 2 of 22: Drawing should identify Areas A and B Operational Landfills.

19. Attachment C: Table C4-3: Table provides the data from the hydraulic conductivity tests from the borrow source materials. The table should include a note regarding the compactive efforts used for the samples that were tested.

20. Attachment C-1: Radiological monitoring data should include a summary conclusion.

I will be available to attend any project meeting to resolve the technical issues identified in this memorandum. In the meantime, if you need any clarification on this memorandum, please contact me at (916) 255-6662.

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NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132**

TELEPHONE: (619) 532-3676

Minutes of the El Toro Technical Review Committee
September 19, 2001

The meeting was called to order by Marcia Rudolph. All attendees introduced themselves. (List Appended). Minutes were reviewed from the May 30, 2001 meeting and approved. There was no Technical Committee meeting held in conjunction with the July 25, 2001 RAB meeting.

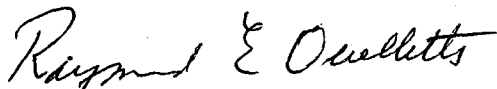
Marcia reviewed the status of various documents received during the period since our last meeting. The committee reviewed various topics that needed to be brought to the attention of the full RAB committee. A list of subjects was developed and consisted of the following items:

- Baseline map of the soil and/or groundwater
- Status of studies regarding elevated radionuclides in groundwater
- Impact that TMDLs may have on future development at the Base
- Status of the "chemical daughter" breakdown products in groundwater
- Status of the source of VOC at Site 24 and whether it has an impact off-base.

The next Technical Review Committee meeting will take place at 5:00 p.m. in the Irvine City Hall before the next RAB Meeting that is scheduled for November 28, 2001.

There being no further business, the meeting was adjourned.

Respectfully Submitted,



Raymond E. Ouellette,
Secretary

Minutes of the El Toro Technical Review Committee
November 29, 2001

The meeting was called to order by Marcia Rudolph. All attendees introduced themselves. (List Appended). No minutes were submitted to be reviewed from the September 19, 2001, meeting.

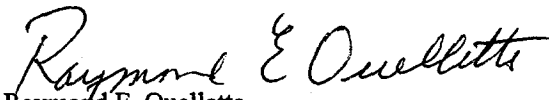
Marcia reviewed the status of various documents received during the period since our last meeting. The committee reviewed various topics that needed to be brought to the attention of the full RAB committee. A list of subjects was developed and consisted of the following items:

- The list of background locations used for the basis of the radiation study should be disclosed and provided to the full RAB. It is imperative that the background locations be truly representative and do not unduly prejudice the technical reports.
- There has been a recent Internet site report that the Navy has lost significant BRAC funding for base closures. What is the impact of this loss of funding to the El Toro BRAC Cleanup? It is requested that Dean Gould be asked to address this issue at an upcoming meeting of the RAB.
- The Alton Parkway extension project is vital to the Cities of Lake Forest and Irvine as well as the Orange County. The Lake Forest City Council passed a resolution encouraging the completion of the extension project. A copy of the resolution is to be given to the RAB tonight.
- The Navy completed the VOC study of Building 307. This building formerly was used as a base dry cleaning facility. The City of Irvine has reviewed some of the data obtained during the study and prepared two letters for the Navy's response. The letters were discussed and are to be submitted to the RAB for the Navy's response.
- With the recent notification of the Navy's intent to transfer Site 1, the ordinance demolition site, to the FBI, the question of who is going to be reviewing the monitoring well data and who is responsible should other contaminants be detected was discussed. It was recommended that the Technical Committee request clarification on this issue at the RAB Meeting.
- The draft EIS prepared by the Federal Government some years ago will soon be released. The technical committee requests that an update of the timeline for release of the data be provided at the next RAB meeting and that clarification as to whether the new EIS will rely on prior 1991 environmental baseline studies or will it use the results of additional RI/FS work that has been completed during the past 10 years.
- The Navy has never provided documentation or provided a written response to the City of Irvine's Solvent Study. The technical committee requests that the Navy provide a response to the RAB and disclose any backup information used to support the Navy's position.

The next Technical Review Committee meeting will take place at 5:00 p.m. in the Irvine City Hall before the next RAB Meeting that is scheduled for 30 January 2002.

There being no further business, the meeting was adjourned.

Respectfully Submitted,


Raymond E. Ouellette
Secretary



BECHTEL NATIONAL INC.

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Contract No. N-68711-92-D-4670

Document Control No.: CTO-0200/0360

File Code: 0216

TO: Contracting Officer
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Mr. Richard Selby, Code 02R1
1220 Pacific Highway
San Diego, CA 92132-5190

DATE: February 15, 2002

CTO #: 200 (EL2)

LOCATION: MCAS El Toro

FROM:

Thurman L. Heironimus, Project Manager

DESCRIPTION: MCAS El Toro, Public Information Materials 1/30/02 Restoration Advisory Board
Meeting Held at Irvine City Hall, Irvine, CA

TYPE: ☐ Contract Deliverable (Cost) ☒ CTO Deliverable (Technical) ☐ Other

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